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## ORIGINAL ARTICLES.

### THE PHYSIOLOGY OF INTERNAL SECRETIONS.<sup>1</sup>

BY W. H. HOWELL, M.D.,

OF BALTIMORE;

PROFESSOR OF PHYSIOLOGY IN THE JOHNS HOPKINS UNIVERSITY.

SO FAR as I am aware, there is no authorized definition of the term "internal secretion," but if we adhere closely to the facts in the case, the expression may be interpreted to mean certain products that are elaborated by gland cells from material furnished by the blood, which are afterward passed back to the blood or lymph stream, to subserve some function in general or special nutrition. From the standpoint of the mechanism of secretion, a useful distinction has been drawn between these internal secretions and secretions of the usual kind, or external secretions. The latter are in all typical cases poured out upon a free epithelial surface that communicates with the exterior, while the internal secretions are discharged upon the closed endothelial surfaces of the blood and lymph vessels.

It is my purpose to-day to call your attention briefly to some of the important results obtained by experimental physiology which tend to prove the existence of internal secretions in a number of glandular organs. The main interest to the physiologist lies, perhaps, in the light this work has thrown upon the functions of the blood glands, or ductless glands, especially the thyroid, suprarenals, hypophysis cerebri, thymus, and spleen. Forty years ago the physiology of these bodies was not only unknown, but was beyond the reach of intelligent hypotheses. Within recent years facts have accumulated, especially with regard to the thyroid and suprarenals, that give us a new standpoint from which to view their physiology—a standpoint also from which experimental investigations may be planned with reasonable hope of abundant success in the future. I shall not attempt an historical review of recent work in this subject, as this has been given already in numerous general addresses and special papers.<sup>2</sup> I desire only to emphasize what seems to be the outcome of the

physiologic work that has been done in the last twelve or thirteen years, and to explain briefly the character of the work now in progress.

If we include under the term "thyroid tissue" not only the thyroid body itself, but also the accessory thyroids and the neighboring parathyroids, it has been shown beyond reasonable doubt that complete removal of this tissue in man and the related mammals is followed, as a rule, by serious disturbances of nutrition which are immediately or ultimately fatal to the animal. Moreover, in these cases the reintroduction of thyroid material into the body, whether this introduction be made by grafting the tissue, by subcutaneous or intravascular injections, or by absorption from the alimentary canal, results in an amelioration, or even entire removal, of the symptoms of malnutrition. The physiologists recall with pleasure that these two fundamental facts were first discovered as the result of experimental work in physiology.

It follows as a logical conclusion from the successful effects attending its therapeutic use, as well as from the evil effects of its destruction or removal, that the thyroid tissue produces, normally, something that is in some way essential to the nutrition of the body. What that something is, has been revealed apparently by the beautiful chemical and clinical researches of Baumann and Roos. Baumann<sup>1</sup> has succeeded in isolating a substance—thyro-iodin, or iodothyroin, as it has been named more recently—which, according to the experiments of Roos,<sup>2</sup> preserves the beneficial effects of thyroid tissue. The fact that extracts of thyroid tissue or iodothyroin when absorbed into the blood ameliorate or remove the evil effects resulting from loss of function of the thyroid seems to prove at once that the normal function of the thyroid tissues is not merely to excrete poisonous material from the blood after the manner of the kidneys. It indicates, on the contrary, that these tissues act normally by giving off a material to the blood that in some way affects favorably the nutrition of all, or a part, of the tissues of the body. In other words, the thyroid tissues form a true internal secretion.

The most important of the facts which remain to be discovered is the manner of action of this secretion

<sup>1</sup> Abstract of a contribution to the discussion upon "Internal Secretions," at the Fourth Triennial Congress of American Physicians and Surgeons, Washington, D. C., May 4, 5, and 6, 1897.

<sup>2</sup> See especially Abelous, *Revue Générale des Sciences*, May 15, 1893; Schäfer, "Address in Physiology, Annual Meeting of the British Med. Assoc.," London, 1895; Meltzer, "On Thyroid Therapy," *New York Med. Journal*, May 25, 1895.

<sup>1</sup> Baumann, *Zeitschrift für Physiolog. Chemie*, Bd., xxi, 1896; also Bd., xxii.

<sup>2</sup> Roos, *Ibid.*, Bd., xxii.

upon the tissues of the body. At present we can only speculate upon the answer to this problem. More experimental work is required before a definite solution can be reached. To account for the action of the thyroid secretion, two main hypotheses have been proposed. According to one hypothesis, the function of the secretion is antitoxic. In some way it antagonizes an unknown toxic substance supposed to be formed in the body in the course of normal metabolism. When the thyroid tissues are removed, this poisonous material, being imperfectly excreted, accumulates in the blood and produces the fatal symptoms of thyroidectomy by a process of auto-intoxication. The other hypothesis assumes that the secretion of the thyroid acts normally by promoting or regulating the metabolism of other parts of the body, particularly, perhaps, of the nervous tissues. We might designate this as the trophic or neurotrophic hypothesis. It is less specific than the antitoxic hypothesis, and therefore, perhaps, less objectionable in the present incomplete stage of our knowledge; but as no decisive, or even probable, proof can be given for either view, it seems unnecessary to criticise the various facts brought forward in support of one or the other of them.

A very interesting phase of thyroid physiology which has recently come to the front is the nature of the functional relationship between parathyroid tissue and thyroid tissue proper, such as is found in the thyroid body and the accessory thyroids. The parathyroids seem to occur in all mammalia. According to a recent description by Kohn<sup>1</sup> there is always one of these bodies on each side attached to the external or posterior surface of the lateral lobes of the thyroid, while in some animals, *e. g.*, the dog, cat, and rabbit, there is an additional one on each side, imbedded in the substance of the thyroid lobes. Histologically, the structure of these small bodies bears no resemblance to that of the thyroid. They possess the generally appearance of embryologic tissue and have therefore been regarded usually as an immature form of thyroid tissue which, under the stimulus of increased functional activity, is capable of developing into normal thyroid structure. Satisfactory evidence is lacking that such a transformation does actually take place under the conditions supposed, as, for example, after complete excision of the two thyroid lobes. On the contrary, the evidence from histology, as well as from embryology, seems to indicate that the two tissues are not only fundamentally different in structure, but are also different in origin.

On the physiologic side, Gley<sup>2</sup> was the first to prove the great importance of the parathyroids. He

showed that in rabbits complete extirpation of the thyroid lobes alone is not followed by fatal result, so long as the parathyroids remain. Removal of both thyroids and parathyroids, however, is in most cases followed by typical symptoms of complete thyroidectomy, ending in the death of the animal. This latter result has been contested by some observers, but renewed investigations have demonstrated its accuracy. Gley explained his results on the hypothesis that after removal of the thyroid, its function is vicariously assumed by the parathyroids. He concluded therefore that the functional value of the two tissues is identical. Recent work, however, tends to throw doubt upon this conclusion. Vassale and Generali<sup>3</sup> state that in dogs and cats removal of all four parathyroids produces the typical acute symptoms of complete thyroidectomy, and finally causes the death of the animal, in spite of the fact that the thyroid body proper is left practically uninjured. On the other hand, complete removal of the thyroid lobes is not immediately injurious to the animal, provided the parathyroids, or, in some cases if even one only of the parathyroids, are left. They contend, therefore, that the result in dogs and cats usually attributed to extirpation of the thyroids is due in reality to the simultaneous removal of the parathyroids.

The results of recent physiologic experiments upon the suprarenal bodies have not been less interesting, although less complete than those upon the thyroid. These curious bodies, like the thyroid, are found constantly in all classes of the vertebrates, and seem, therefore, to be organs of fundamental importance. As long ago as 1856, Brown-Séquard<sup>4</sup> stated that extirpation of both suprarenals is usually fatal to the animal, death occurring generally very shortly after the operation—more rapidly, according to this observer, than after removal of both kidneys. This statement has been questioned frequently by other observers, but the results of the renewed investigations that have followed the recent revival of interest in the physiology of the ductless glands seem to corroborate fully the account given by Brown-Séquard. In the case of dogs, according to Szymonowicz,<sup>5</sup> death follows the operation within fifteen hours. It has been shown, also, that in some species of animals accessory suprarenals are not uncommon, and it is possible that this fact may explain the survival of a certain number of animals after supposed complete extirpation of the suprarenals. Removal of only one suprarenal does not appear to

<sup>1</sup> Vassale and Generali, *Archives Italiennes de Biologie*, xxv. and xxvi, 1896.

<sup>2</sup> Brown-Séquard, "Comptes rendus de l'Ac. des Sciences," XLIII., 1856; *Journal de la Physiologie*, I., 1858.

<sup>3</sup> Szymonowicz, *Archiv. J. d. gesammte Physiologie*, LXIV., 1896.

<sup>1</sup> Kohn, *Archiv. für mik. Anatomie*, Bd. 44, 1894.

<sup>2</sup> Gley, *Archives de Physiologie Normale et Pathologique*, 1892.

cause any noticeable effect. In the case of complete removal, followed by a fatal result, the prominent symptoms preceding death are extreme muscular weakness, asthenia, and, in the case of dogs examined during this period, a great fall in blood pressure, together with a feeble heart-beat. It will be noted that in cases of Addison's disease in man the important symptoms, in addition to the pigmentation, are also an asthenic condition of the muscles and the heart. What explanation have we to offer for the surprisingly profound effect produced upon the body by the removal of these small organs?

Unquestionably the most significant facts with regard to this problem have been obtained from a study of the effects of injections of suprarenal extracts into living animals. A number of the earlier experiments of this kind, especially those performed upon rabbits, resulted in the death of the animal, the preceding symptoms being convulsive movements, followed by some paralysis. The really valuable results, however, have been obtained by a more exact study of the effects of such injections upon the vascular and respiratory organs. Most of our knowledge upon these points has been derived from the researches of Oliver and Schäfer<sup>1</sup> and Cybulski and Szymonowicz.<sup>2</sup> The important facts determined by them, and since corroborated in many laboratories, are as follows: Extracts of the medulla of the suprarenal bodies injected into the veins of a living animal cause a pronounced slowing of the heart-beat and a large rise of blood pressure. If the animal is first given atropin to paralyze the inhibitory nerves to the heart, or if the vagi are previously cut, the injection causes usually a marked quickening, instead of a slowing of the heart-beat, and a greater, indeed often an extraordinary, rise of blood pressure. The respiratory organs are not affected so seriously, a temporary slowing and shallowing of the respiratory movements being the result usually noticed. The effect upon the heart and blood-vessels is quite temporary. Its exact duration depends somewhat upon the dose, and in part upon other less evident conditions, but, as a rule, within a very few minutes the rise in blood pressure, as well as the slowing of the heart-beat, passes off completely.

The physiologic explanation of the slowing of the heart caused by the suprarenal extracts offers no difficulties. Since this effect disappears completely upon section of the vagi, or after the injection of a few milligrams of atropin, it can only be due to a stimulating action upon the central endings of the inhibitory fibers, that is, upon the so-called cardio-

inhibitory center in the medulla. According to Oliver and Schäfer, the inhibitory effect is felt mainly upon the auricles. The beats of this part of the heart become weaker and slower and may cease altogether, while the ventricular beats, although slower, are more vigorous. After the vagi have been cut, suprarenal extracts cause a quicker and, according to Oliver and Schäfer, who measured the extent of contractions directly, a stronger beat. This accelerating effect upon the heart after removal of the inhibitory fibers is not due, as we might at first suppose, to a stimulation of the central ends of the accelerator fibers, since it is still obtained after section of the cord in the neck, or after extirpation of the first thoracic ganglia. It must therefore be due to a peripheral action of the extracts upon the heart itself, either upon the muscle of the heart directly (Oliver and Schäfer), or upon the so-called motor ganglia (Szymonowicz).

The effect of the injections upon blood pressure has been explained differently by those engaged in the work. Both Oliver and Schäfer, and Cybulski and Szymonowicz believe that the enormous rise in blood pressure is due mainly to a great constriction of the arterioles. According to the latter this constriction is brought about by a stimulating action of the extracts upon the vasomotor centers in the medulla and cord, while according to Oliver and Schäfer, the action is exerted directly on the muscles of the blood-vessels. Szymonowicz admits that if the cord is cut just below the medulla, a great rise of pressure can still be obtained, but he explains this by supposing that the extract acts on the spinal centers. He asserts that if the entire cord is destroyed, a rise of pressure can no longer be obtained. The experiment that he gives to illustrate this last point is, however, far from being convincing. The protocol of the experiment shows that the act of destroying the cord in itself reduced the blood pressure to zero. Moreover, Biedl<sup>1</sup> reports that he has been able to get a rise in pressure from injection of the extracts after complete extirpation of the cord. The evidence therefore seems to favor the view proposed by Oliver and Schäfer, and this view is still further supported by the fact that when the volume of a limb is measured plethysmographically it often shows a distinct diminution after suprarenal injection, even though its nervous connections with the central nervous system are entirely severed.

The significance of the marked reaction exhibited by suprarenal extracts depends very largely upon the possibility of proving that the substance producing the reaction is formed normally within the gland. It is conceivable, of course, that in the dead gland

<sup>1</sup> Oliver and Schäfer, *Journal of Physiology*, XVIII., 1895.

<sup>2</sup> Cybulski and Szymonowicz, *Gazeta Lekarska*, 1895. (Abstracted in *Jahresb. d. Thier. Chir.*, 1895. Also Szymonowicz, *Archiv. für d. gesammte Physiologie*, LXIV., 1896.

<sup>1</sup> Biedl, *Wien. klin. Wochenschrift*, ix, 1896.

*post-mortem* changes might cause the formation of a substance giving this reaction, although under the normal conditions of life it might never be formed. Fortunately we have direct proof that the active substance in question is a normal product of the metabolism in the gland. Cybulski and Szymonowicz found that blood drawn from the suprarenal vein when injected into the circulation of a normal animal gives the same effect, although less in amount, as extracts of the suprarenal glands, while blood from other veins has no such action. This result has been denied by Oliver and Schäfer, apparently upon insufficient experimental grounds. Langlois,<sup>1</sup> on the contrary, has been able to corroborate this effect of suprarenal blood, and in the laboratory at Baltimore Dr. Dreyer has obtained clear proof of a similar action. It appears from Dr. Dreyer's experiments that the effect is not obtained in every animal, but in some cases the results are very positive, and in a matter of this kind the positive evidence is the most important. When we remember that we are dealing most probably with a material formed by the secretory activity of gland cells, and that the amount of this material may vary at different times or under different circumstances, it is not surprising that negative as well as positive results are obtained.

Since it seems certain that the substance does occur under normal conditions in the venous blood flowing from the gland, we are justified in concluding that it is a normal product of the metabolism of the medullary cells of the gland, and that it is discharged or secreted directly into the blood. It must, therefore, exert continually a stimulating effect upon the heart and blood-vessels. In corroboration of this last conclusion, we have some striking experiments recorded by Szymonowicz which show that that, after complete extirpation of the two glands, the blood pressure becomes greatly depressed. Both Oliver and Schäfer, and Cybulski and Szymonowicz conclude that the normal function of the suprarenals consists in furnishing this stimulating substance to the blood. The former observes believe that its effect is mainly upon the muscular tissue, that it has a general tonic or augmenting action on all varieties of muscle found in the body—the striated muscle, as well as the cardiac and plain muscle tissue. Cybulski and Szymonowicz hold essentially the same general view, except that they believe that the substance acts upon the nerve centers controlling the muscular tissues, rather than on these tissues directly. It is, perhaps, impossible at present to decide as to this detail. Upon either of

the views proposed we can understand at once why removal of the suprarenals brings on a condition of muscular asthenia, and why the continual activity of these organs is so essential to the body as a whole. It is significant in this connection to recall that Oliver and Schäfer found that extracts of the suprarenals in cases of Addison's disease did not contain this stimulating substance.

A third interesting member of the group of ductless glands is the hypophysis cerebri, and a few words may be said as to its supposed physiologic activity. This gland is commonly described as consisting of two parts, the anterior and the posterior lobe. The histology and the embryology of the two parts indicate that they are entirely different in origin and in structure. The anterior lobe is evidently a glandular structure. It develops originally as a saccular invagination from the buccal epithelium, and has essentially the same origin in all the vertebrates which have been examined. According to Haller<sup>2</sup> it is not strictly a ductless gland, since it possesses an imperfectly developed system of ducts which opens between the dura and the pia mater. It is evidently a secreting structure, and the fact that its secretion is discharged between the meningeal membranes, suggests some special connection with the physiology of the brain. Histologically, its structure recalls that of the thyroid gland, particularly in the fact that a colloidal material is said to occur frequently in the lumina of the gland tubules. In some animal, e.g., the dog and the cat, it is a very small body, but in others, as the rabbit, sheep, ox, and man, it is of considerable size, and bears every indication in its structure of being an active secretory organ.

The posterior lobe, on the contrary, is very small in all animals, and has the appearance of being a rudimentary organ. It develops as an outgrowth from the infundibulum of the brain, and is more properly spoken of as the infundibular lobe. Its histology is very incompletely known. According to Berkley<sup>3</sup> it contains numerous typical nerve-cells, ependymal cells and neuroglia, a number of glandular epithelial cells arranged in part to form tubes or closed vesicles that contain a colloidal material, and some curious structures resembling nerve-end organs. If this description is correct, it seems quite certain that the entire lobe does not originate from the nerve tissue of the brain.

The observations bearing upon the functions of the hypophysis have been limited to the glandular lobe. On the pathologic side it has been shown that in many, if not in most, of the cases of acromegalia, the glandular lobe exhibits pathologic changes.

<sup>1</sup> Langlois, *Archives de Physiologie Normale et Pathologique*, 152, 1897.

<sup>2</sup> *Morphologisches Jahrbuch*, xxv, 1896.

<sup>3</sup> Berkley, *Johns Hopkins Hospital Report*, iv, 1895.

For this reason, extracts of the gland have been used therapeutically in cases of acromegalia and, according to some reports, benefits have followed the treatment to the extent that some of the disagreeable symptoms have shown amelioration. The evidence from this side, however, is not satisfactory, and the nature of the connection between acromegalia and disturbance of the function of the hypophysis, if any exists, needs more complete investigation.

The experiments made by the physiologists are also meager and inconclusive. Gley<sup>1</sup> reports a set of experiments made upon rabbits in which he attempted to destroy the gland by an operation from above. The experiments were made upon rabbits from which the thyroid lobes had been previously removed, with the idea of demonstrating that a similarity in function exists between the thyroid and the hypophysis. All but one of the animals died owing to the severity of the operation. In the single survivor it was noted that the animal exhibited at times spasmotic muscular contractions, and some degree of paresis, and that it died about a year after the operation. On the assumption that the animal would have lived if the thyroid lobes alone had been removed Gley concluded that the removal of the hypophysis had prevented the parathyroids from replacing completely the loss of the thyroid, and that, therefore, the hypophysis is related in function to the thyroid tissue. Naturally but little importance can be attached to a single experiment of this kind, and so far as I know the author has not repeated the investigation. Vassale and Sacchi<sup>2</sup> claim to have removed the hypophysis partially or completely in a number of animals by an operation through the base of the skull. In cases of complete removal the animals died within a short time—fourteen days—after exhibiting a number of symptoms similar to those caused by thyroidectomy, such as muscular tremors and spasms, and the development of a cachectic condition. Most physiologists, I fancy, will accept these experiments also with considerable hesitation. The very severe character of the operation necessary to reach the gland makes it questionable whether the results reported were due to its removal alone.

Szymonowicz, and also Oliver and Schäfer, report experiments upon the effects of injections of extracts of hypophysis into the circulation of normal animals. Szymonowicz states that in two experiments he obtained a slight fall of pressure and a quickening of the heart-beat. He concludes, therefore, that the physiologic action of these extracts is opposed to that caused by extracts of the suprarenals. Oliver and

Schäfer, on the contrary, report that extracts of hypophysis exert an effect very similar in some ways to that shown by suprarenal extracts. For instance, they cause a marked rise of blood pressure, together with an augmentation of the heart-beat. Unlike the suprarenal extracts, however, they do not produce a slowing of the heart-rate when the vagi are intact. Upon the basis of these incomplete experiments, they draw the hasty conclusion that the hypophysis and the thyroid are not similar in function, and that the hypophysis is not capable of assuming vicariously the activities of the thyroid.

I have recently made a number of experiments upon this organ, the results of which have been quite uniform, and in many respects very different from those obtained by the authors just quoted. My experiments were made with the hypophysis of sheep mainly, although at first the gland of the dog was used. The extracts were made in normal saline, or in glycerin followed by dilution with normal saline, and usually the fresh gland was employed. The experiments differed from those reported by others, in that extracts were made separately of the glandular and the infundibular lobe, and the physiologic effects of each were tested by injection into the circulation of normal dogs. It was found that the extracts of the glandular lobe have little or no perceptible effect when injected alone. Extracts of the small infundibular lobe, on the contrary, have a distinct and remarkable effect upon the heart-rate and blood pressure, an effect which resembles in some respects, and differs in others, from that shown by suprarenal extracts. Briefly stated, these extracts injected into the normal animal with its vagi intact cause a very pronounced slowing of the heart-beat, similar to that caused by suprarenal extracts, but lasting a much longer time. The heart-beat is not only slowed but is considerably augmented in force, as is shown by tracings taken with a Hürthle manometer. At the same time the blood pressure rises to a considerable extent, owing, apparently, to a peripheral constriction of the blood-vessels, since oncometer tracings from the kidney show that this organ shrinks greatly in volume. Usually the constriction of the blood-vessels occurs first, so that the pressure rises for about twenty millimeters or more of mercury. This is succeeded sometimes by a temporary fall of pressure during which the heart-rate may be increased, and then the slowing of the heart begins, while the pressure rises again to a greater or less extent above the normal. This last effect continues for a relatively long time, and passes off gradually. If the dose used is a maximal one, and a second injection is given too quickly afterward, little or no effect is obtained. If, however, the dose is not too strong, and sufficient

<sup>1</sup>Gley, *Archives de Physiologie Normale et Pathologique*, 1892, 311.

<sup>2</sup>Vassale and Sacchi, *Archives Ital. de Biologie*, xxi, cxxdii, 1895.

time is given for its action to wear off, a repetition of the effects is obtained, and this may occur a number of times, although the effects decrease progressively in intensity.

The effects of the injection are somewhat different if the vagi are previously cut, or if a little atropin is given to paralyze the inhibitory fibers. Under these circumstances the slowing of the heart-rate is very much less marked, although not entirely lacking. In round numbers it may be said that, with the vagi intact, the heart-rate is reduced about fifty per cent., while in the atropinized animal the reduction is about twenty per cent. It might be added that an animal deeply under ether behaves in this respect like an animal with its vagi cut. This result indicates that the slowing of the heart-rate in a normal animal is due in part, but only in part, to a direct action on the medullary centers of the inhibitory fibers. On the other hand, the rise of blood pressure is greater. Usually the blood pressure rises rapidly for about twenty millimeters of mercury; this is succeeded in some cases by a temporary fall, and then the pressure again rises rapidly, reaching a height, in some cases, nearly equal to that caused by suprarenal extracts. During this last phase the heart-beats are somewhat slower and more powerful, the effect in this respect differing from that caused by suprarenal extracts. The effect lasts longer than with suprarenal extracts, and a longer interval must be allowed before a new injection will give the same result.

I have obtained a marked rise of pressure from injection of extracts of the infundibular lobe, after severance of the cord below the medulla, and in one case after entire removal of the thoracic part of the spinal cord in addition, thus indicating that the action of the blood-vessels is probably a peripheral effect, and not due to stimulation of the vaso-motor centers. These observations that I present here only incompletely may be taken to indicate that the infundibular lobe of the hypophysis is, in all probability, not a rudimentary organ, but a structure that has some important physiologic activity. Moreover, its function is probably different from that of the glandular lobe, and possibly quite independent of it. With regard to the function of the glandular lobe, the method of injecting extracts into the circulation of a normal animal seems to teach us nothing. While the negative results thus obtained do not oppose, they cannot be said to support the favorite hypothesis that this part of the hypophysis cerebri has a function resembling that of the thyroid lobes. I venture to suggest that this supposed similarity in function might be tested most satisfactorily upon human beings by feeding the gland in cases of

myxedema or goiter, and ascertaining whether a reaction similar to that caused by the thyroid can be obtained.

#### A CLINICAL STUDY OF THE ACTION OF THE NUCLEINS IN TUBERCULOSIS.

BY HERBERT MAXON KING, M.D.,  
OF GRAND RAPIDS, MICH.;  
PHYSICIAN TO THE BUTTERWORTH HOSPITAL; FORMERLY IN-  
STRUCTOR IN LARYNGOLOGY AT THE NEW YORK  
POST-GRADUATE MEDICAL SCHOOL.

IN passing judgment on the value of the nucleins in the treatment of tuberculosis, and before forming too hasty conclusions from the report which I submit herewith, a few important facts regarding these products, their preparation and elaboration, and the technic of their administration must be considered in order that the true value of nuclein, as a therapeutic agent, may be estimated with some degree of fairness.

It is not within the scope of this paper, nor is it at all necessary here, to enter into an exhaustive account of the early history of these products, nor to go into details of their growth and elaboration to the stage of perfection which they have reached. The work on the nucleins pursued by Hoppe-Seyler, Miescher, Von Jaksch, Kossel, Altmann, Horbaczewski, Vaughan, and McClintock, has been ably reviewed in several masterly papers by Professor Vaughan and Dr. McClintock, notably in the annual address on medicine, "The Nucleins and Nuclein-therapy," delivered in 1894 at the meeting of the Michigan State Medical Society (see "Trans. Mich. State Med. Soc.," 1894), to which all have access; but it does seem necessary in considering the subject to remember that nuclein is a comparatively new therapeutic agent, scarcely three years having elapsed since its introduction. Again, it must be remembered that when first employed therapeutically the solutions obtainable contained many impurities which were afterward eliminated to a certain extent, and that the actual chemical value of the solutions was an uncertainty. This placed its hypodermic employment at a disadvantage, and made the estimation of the clinical value a slow process. Hypodermic medication in any event, involves special attention to the behavior of the patient, and to the general supportive treatment. Idiosyncrasies demand closer observation and attention, and especially when treatment is directed, as in the case of nuclein in tuberculosis, toward altering the process of normal metabolism. Furthermore, in tuberculosis we have to deal with a disease usually of very slow development, to change the course of which is at best, and under most favorable circumstances, a matter of considerable time. With all

this in view it is perfectly obvious that a fair estimate of the value of any remedy directed to the cure of tuberculosis cannot be made from the clinical history of a single case, nor from that of any number of cases in the space of a few months.

Early in August, 1894, I began the employment of solutions of yeast nuclein in the treatment of tuberculosis in man, and until the present time I have felt that any report which I might make on the subject would neither be of value to the profession, or just to the remedy. In the following report I have made no attempt at a selection of cases, and I have endeavored in every instance to take a conservative view of the results as they were obtained, and to form no conclusions not founded upon demonstrable facts. The preparations of nuclein which I have employed in the treatment of the cases reported have been as follows: The original impure solution supposed to contain 2 per cent. of nucleinic acid (afterward found to contain much less than that); the improved 1-per-cent. solution, which was first obtainable in June, 1895 (the improvement consisting, according to Dr. McClintock, essentially, in the removal of a lot of impurities, for the most part albumins, and a considerable amount of coloring matter, the nature of which is unknown, but probably having some connection with the Xanthin bases); some 3-per-cent., and 10-per-cent. solutions, prepared for me through the kindness of Dr. McClintock, and the solution now obtainable containing 5 per cent. of nucleinic acid. All these have been solutions of *yeast* nuclein, and, although I have used them *per os* to a very limited extent as an adjunct to the hypodermic method, it is from the hypodermic employment that I have obtained the results reported below. Besides these solutions of yeast nuclein I have used a dry, powdered spleen nuclein *per os*, mainly as an adjunct to the hypodermic use of the solutions. This product, according to McClintock, contains about 6 per cent. of phosphorus, and is practically a pure nucleinic acid prepared from the spleen. I was enabled to obtain this product also through the courtesy of Dr. McClintock.

As regards the dosage and the technic of administration, I used the original impure solution in daily hypodermic injections of from 30 to 100 minims given at one dose. These injections of course occasioned considerable pain and induration at the point of injection, and often had to be discontinued for a short time. The reaction generally was considerable, and in two instances was so severe that the treatment was abandoned as impracticable. These two cases are included among my "failures," so termed. As soon as the improvements before mentioned were made in the preparation of the solution I increased

the dosage until in a few cases I reached 300 minims, injected hypodermically once daily. This dose, however, was too large in the majority of cases, causing considerable reaction attributable to the mechanical presence of so large an amount of fluid in the tissues, and I found that the best results were obtained from injections of from 100 to 200 minims.

In the case of the 3-per-cent. solution, which was the first strong solution employed, I made the injection daily of 100 minims, with very little unpleasant reaction. The hypodermic use of the 10-per-cent. solution was wholly an experiment, and I began with 10 minims, increasing to 50 minims, and in two instances I injected 100 minims at a single dose. This was followed in both cases by such violent reaction, however, that I afterward never exceeded 50 minims at a single injection. This concentrated solution was used in four cases, all of which improved rapidly, but the care and attention to details of technic which the employment of this preparation necessitated convinced me that for practical purposes the more dilute solutions are preferable. Finally, I speak of the 5-per-cent. solution which has now been obtainable for some time. When first given to the profession it was intended for administration *per os* only, but I have always employed it hypodermically and have obtained far better results from it than from any other preparation of yeast nuclein which I have used. While having given as high as 100 minims at a single dose, I have found that in tuberculosis the best results are obtained from daily injections of 50 minims. It is unnecessary to add that in nuclein medication no arbitrary rules of dosage can be laid down. Good judgment and proper attention to idiosyncrasies, together with a suitable and appropriate supportive treatment, are essential to success.

In my experience, the portion of the body best adapted to the reception of the injection is, in the great majority of cases, the subcutaneous areolar tissue overlying the gluteal muscles. In some instances, they may with impunity be administered below the angles of the scapulæ, or low down in the axilæ. In the shoulders and breasts they cause more local disturbance, while in the arms, legs, or thighs, the injections occasion far more pain and local reaction than will be borne by patients generally, and especially by those not confined to bed. In making the injection, the surface of the part selected is exposed and sponged thoroughly with a 5-per-cent. solution of carbolic acid; the needle is then inserted its full length (one inch) at an angle of about seventy-five degrees, and the piston steadily pressed until all of the solution is injected. When the dose is 50 minims, fifteen seconds should be allowed for the injec-

tion. With the observance of these simple precautions the least possible pain is inflicted, and I have never had suppuration follow, except in one case, when it was directly attributable to lack of proper care of the needle. Patients should, of course, be supplied with their own needles. I have often been asked what nature of reaction might be expected to follow nuclein injections, and to what degree it might occur without contraindicating its employment. Leaving idiosyncrasies out of consideration, I have found that in the majority of cases the local reaction is merely one of mechanical disturbance dependent for its extent upon the *amount* of the solution injected. Dr. McClintock early pointed out to me the importance of the chemical reaction of the solutions used as affecting the irritation following the injection. I have not found any marked difference in the irritation produced by injections of solutions which are slightly acid, neutral, or slightly alkaline in reaction. A slight alkalinity of the solution is undoubtedly preferable because it is possibly less irritating, and because it is more readily absorbed. The symptomatic reaction varies in different cases. An injection of unusual size or concentration is followed by a rise of temperature of from  $.4^{\circ}$  to  $3^{\circ}$  F., and a proportionate pulse-rate. This reaction is much less in degree if the maximum dosage is approached gradually. Rise of temperature and increase in pulse-rate are produced by hypodermic injections of nuclein solutions in healthy persons, as may be remarked in the experiments to be reported presently. After the injections have been repeated for a considerable number of consecutive days, patients sometimes complain of a "malarial aching" in the joints, and a feeling of general malaise, passing off later with the physiological accommodation which follows. These and various other subjective symptoms which are often observed to follow nucleinic medication are, in my opinion, due to the continued leucocytosis produced by the nuclein injections when often repeated.

In the following report I shall avoid as far as possible the tedium of exhaustive detail which a clinical account of a considerable number of cases at best involves, and limit myself to general results except when special interest requires more complete individual discussion. Suffice it to say that in the 37 cases reported there has been no question as to diagnosis. In all but 3, the diagnosis was confirmed by the presence of tubercle bacilli in the sputum or urine, or both. Two of these 3 were cases of tuberculous lymphangitis without pulmonary involvement, in 1 of which the diagnosis was made a number of years before by the microscopic appearance of one of the glands after surgical removal, while in the other diag-

nosis was confirmed by several eminent clinicians. In the third case, in which bacilli were not found, there was no expectoration, the process in the lungs never having gone beyond consolidation. It was pronounced tuberculosis upon the evidence presented by the physical signs, together with that of the personal and family history. The average age of the 37 patients was 31.2 years, the extremes being 16 and 61 years, respectively. Eighteen cases were complicated by tuberculous disease elsewhere than in the lungs; of these, as the report will show, 10 had tuberculous laryngitis, and of the remaining 8, 5 had nephritis, 2 had lymphangitis, and 1 had tuberculosis of the testes, and of one or more of the vertebrae.

Classification of patients suffering from tuberculosis is rather an unsatisfactory, not to say difficult, matter, and the plan which I have adopted does not fully meet the requirements of a finished statistical report, but I think it the least objectionable of any which does not involve individual record, and in a paper like the present it may be well to add that in every instance I have kept a complete clinical record, the important results of which are embodied in this report. I have classified the cases reported, (1) according to the length of time treated; (2) according to the stage which the disease had reached when treatment was begun, *i.e.*, incipient, advanced, and far advanced, and (3) according to the complications existing. Proceeding, therefore, under this classification, the first to be considered is:

*Class I.*—(10 patients treated one month or less.)  
(a) Incipient stage, 2; advanced stage, 3; far advanced stage, 5; (b) uncomplicated, 5; laryngeal complications, 3; other complications, 2.

*Results in Class I.*—Apparently cured, 1; disease arrested, 0; improved, 0; unimproved or failure, 9; died during treatment, 0; died since cessation of treatment, 5; present condition unknown, 1; known to be living, 4.

In this class, for obvious reasons, failure is the rule. In one case this was due to arbitrary unwillingness on the part of the patient to continue the injections, while in three cases nuclein was inadmissible on account of idiosyncrasies. Two of these three, as before mentioned, were under observation and treatment prior to the improvements made in the nuclein solutions. The majority of the failures reported in this, as in other classes, were expected from the first, the treatment being adopted more to gratify the desire of the patient than with any hope of success. Yet even in these forlorn patients I have occasionally seen the most marked temporary improvement follow the injections.

It might be well here to briefly explain what

is meant by "apparently cured." In tuberculosis we have a pathologic condition which, after the incipient stage, is marked by destruction of tissue. It is clearly impossible to replace any part or the whole of a broken-down lung, but when we have assisted nature to throw out protecting adhesions, and procured a clean cicatrix in the place of a suppurating surface, it seems to me only reasonable to pronounce the result a cure, in the sense that surgical amputation for a gunshot wound of the knee-joint is a cure; but at the same time, since it is impossible to pronounce a tuberculous wound cured, even after the subsidence of morbid activity, until it has remained well for a reasonable length of time without relapse, and since I do not consider two years a sufficiently rigid time-test in these cases, I prefer to designate such cases as have given me this happy result in this way. This number embraces such as have ceased to show all physical manifestation of morbid activity.

I proceed now to the consideration of

*Class II.*—(12 patients treated from one to three months.) (a) Incipient stage, 3; advanced stage, 4; far advanced stage, 5; (b) uncomplicated, 7; laryngeal complications, 3; other complications, 2.

*Results in Class II.*—Apparently cured, 3; disease arrested, 2; improved, 4; unimproved or failure, 3; died during treatment, 1; died after cessation of treatment, 0; present condition unknown, 3; known to be living, 8.

*Class III.*—(12 patients treated from three to twelve months.) (a) Incipient stage, 1; advanced stage, 6; far advanced stage, 5; (b) uncomplicated, 4; laryngeal complications, 5; other complications, 3.

*Results in Class III.*—Apparently cured, 3; disease arrested, 3; improved, 2; unimproved or failure, 4; died during treatment, 2; died after cessation of treatment, 3; present condition unknown, 0; known to be living, 7.

*Class IV.*—(3 patients treated for more than one year.) (a) Incipient stage, 1; advanced stage, 2; far advanced stage, 0; (b) uncomplicated, 3; laryngeal complications, 0; other complications, 0.

*Results in Class IV.*—Apparently cured, 1; disease arrested, 2; improved, 0; unimproved or failure, 0; died during treatment, 0; died after cessation of treatment, 0; present condition unknown, 2; known to be living, 3.

#### GENERAL SUMMARY.

*Classification.*—(37 patients treated.) (a) Incipient stage, 7; advanced stage, 15; far advanced stage, 15; (b) uncomplicated, 19; laryngeal complications, 10; other complications, 8.

*General Results.*—Apparently cured, 8; disease arrested, 7; improved, 6; unimproved or failure, 16; died during treatment, 3; died after cessation of treatment, 8; present condition unknown, 6; known to be living, 22.

Leaving out of consideration those cases reported under "disease arrested" and "improved" we have nearly 22 per cent. of apparent cures, a result which I cannot but consider eminently satisfactory. And it is worthy of consideration, also, that this result has been obtained without recourse to change of climate, in a portion of Michigan where the disease in question is notoriously prevalent. By far the majority of these patients were members of families of very limited means, unable to procure any of the luxuries and deprived of many of the necessities within reach of the rich. So far as was possible hygienic conditions were improved, and, as I have intimated, strict attention was given to the general supportive treatment and nutrition.

Now as to the effect of the treatment upon the prominent symptom of the disease. As regards the expectoration: Number of patients in whom the expectoration contained bacilli of tuberculosis: Before treatment, 34; after treatment, 26. Number of patients who had either no bacilli or no expectoration: Before treatment, 3; after treatment, 11. Number of patients who gained in weight under treatment, 16; number of patients who lost in weight under treatment, 11; number of patients whose weight was not recorded, 10.

I now desire to call attention to what I consider some very important observations relative to the comparative value of the blood in tuberculous patients treated with nuclein. Unfortunately, I delayed making these investigations in several cases until the patients had already been treated for some time, so that the gain or loss in those cases does not date from the commencement of the treatment. I will report the result in 10 cases, which I think will be a sufficient number upon which to base conclusions. The observations were taken in all cases at least twenty-four hours after the last previous treatment, and as far as possible all observations in the same patient were made under like conditions, that is, as to time of day, temperature, pulse, and intervals from the taking of food. The Thoma-Zeiss counting apparatus and Von Fleischl's hemoglobinometer were used in all cases.

*CASE I.*—Treatment begun May 2d. Daily hypodermic injections of 100 minims of a 1-per-cent. solution of yeast nuclein, and 10 grains of nucleic acid from the spleen *per os*, three times daily. First examination, June 15th: Red corpuscles, 4,125,000 per c.mm.; white corpuscles, 9150 per c.mm.;

hemoglobin, 65 per cent. normal. Proportion of white to red corpuscles, 1:451. Second examination, one month later: Red corpuscles, 4,550,000 per c.mm.; white corpuscles, 9650 per c.mm.; hemoglobin, 90 per cent. normal. Proportion of white to red corpuscles, 1:471. An increase in red corpuscles of 425,000 per c.mm.; an increase of hemoglobin of 25 per cent. This case was one of "apparent cure."

**CASE II.**—Treatment began May 22d, same as in last case reported. First examination, June 15th: Red corpuscles, 3,475,000 per c.mm.; white corpuscles, 12,900 per c.mm.; hemoglobin, 60 per cent. normal. Proportion of white to red corpuscles, 1:296. Second examination, fifteen days later: Red corpuscles, 3,650,000 per c.mm.; white corpuscles, 12,800 per c.mm.; hemoglobin, 55 per cent. normal. Proportion of white to red corpuscles, 1:285. (Numerous microcytes present.) An increase in red corpuscles of 175,000 per c.mm.; a loss in hemoglobin of 5 per cent. This case is reported among the "failures."

**CASE III.**—Treatment began May 25th, same as in previous case. First examination, June 15th: Red corpuscles, 3,550,000 per c.mm.; white corpuscles, 15,000 per c.mm.; hemoglobin, 65 per cent. normal. Proportion of white to red corpuscles, 1:237. (Numerous poikilocytes present.) Second examination, one month later: Red corpuscles, 4,325,000 per c.mm.; white corpuscles, 15,600 per c.mm.; hemoglobin, 75 per cent. normal. Proportion of white to red corpuscles, 1:271. (No poikilocytes present.) Increase in red corpuscles of 875,000 per c.mm.; an increase in hemoglobin of 10 per cent. This case is reported as "disease arrested."

**CASE IV.**—Not previously treated. Treatment consisted in injections every alternate day of 30 to 50 minims of a 5-per-cent. nuclein solution, and administration of the dry spleen nuclein, as in the other cases. First examination: Red corpuscles, 4,175,000 per c.mm.; white corpuscles, 8200 per c.mm.; hemoglobin, 80 per cent. normal. Proportion of white to red corpuscles, 1:509. Second examination, one month later: Red corpuscles, 3,550,000 per c.mm.; white corpuscles, 34,050 per c.mm.; hemoglobin, 70 per cent. normal. Proportion of white to red corpuscles, 1:104. (Numerous microcytes present.) Loss in red corpuscles of 625,000 per c.mm.; a loss in hemoglobin of 10 per cent. This case is reported among the "failures."

**CASE V.**—Had been under treatment for one year. Treatment same as in case last reported, except that 50 minims of a 5-per-cent. nuclein solution were injected daily. First examination: Red corpuscles, 3,900,000 per c.mm.; white corpuscles, 8125 per c.mm.; hemoglobin, 80 per cent. normal. Proportion of white to red corpuscles, 1:480. (Poikilocytes present.) Second examination, five months later: Red corpuscles, 4,425,000 per c.mm.; white corpuscles, 10,900 per c.mm.; hemoglobin, 85 per cent. normal. Proportion of white to red corpuscles, 1:406. (No poikilocytes present.) An increase in

red corpuscles of 525,000 per c.mm.; an increase of hemoglobin of 5 per cent. This case is reported as "disease arrested."

**CASE VI.**—Not previously treated. Treatment same as in last case. First examination: Red corpuscles, 4,375,000 per c.mm.; white corpuscles, 12,500 per c.mm.; hemoglobin, 85 per cent. normal. Proportion of white to red corpuscles, 1:350. Second examination, one month later: Red corpuscles, 3,350,000 per c.mm.; white corpuscles, 11,550 per c.mm.; hemoglobin, 70 per cent. normal. Proportion of white to red corpuscles, 1:290. Loss in red corpuscles of 1,025,000 per c.mm.; a loss in hemoglobin of 15 per cent. This case is reported among the "failures."

**CASE VII.**—Not previously treated. Treatment same as in last case. First examination: Red corpuscles, 3,275,000 per c.mm.; white corpuscles, 12,150 per c.mm.; hemoglobin, 50 per cent. normal. Proportion of white to red corpuscles, 1:269. Second examination, one month later: Red corpuscles, 4,650,000 per c.mm.; white corpuscles, 8000 per c.mm.; hemoglobin, 60 per cent. normal. Proportion of white to red corpuscles, 1:581. Increase in red corpuscles of 1,375,000 per c.mm.; an increase of hemoglobin of 10 per cent. This case is reported as "improved."

**CASE VIII.**—Treated six days. Treatment same as in last case. First examination: Red corpuscles, 4,775,000 per c.mm.; white corpuscles, 17,150 per c.mm.; hemoglobin, 80 per cent. normal. Proportion of white to red corpuscles, 1:278. Second examination, three months later: Red corpuscles, 4,950,000 per c.mm.; white corpuscles, 13,100 per c.mm.; hemoglobin, 90 per cent. normal. Proportion of white to red corpuscles, 1:378. Increase of red corpuscles of 175,000 per c.mm.; an increase of hemoglobin of 10 per cent. This case is reported as "disease arrested."

**CASE IX.**—Not previously treated. Treatment: Daily injection of 100 minims of a 3-per-cent. nuclein solution. First examination: Red corpuscles, 3,425,000 per c.mm.; hemoglobin, 90 per cent. normal. Second examination, six months later: Red corpuscles, 4,300,000 per c.mm.; hemoglobin, 100 per cent. normal. Increase in red corpuscles of 875,000 per c.mm.; an increase of hemoglobin of 10 per cent. This case reported as "apparently cured."

**CASE X.**—Not previously treated. Treatment: Daily injections of 50 minims of a 10-per-cent. nuclein solution. First examination: Red corpuscles, 4,125,000 per c.mm.; white corpuscles, 14,050 per c.mm.; hemoglobin, 65 per cent. normal. Proportion of white to red corpuscles, 1:222. Second examination, one month later: Red corpuscles, 5,050,000 per c.mm.; white corpuscles, 8125 per c.mm.; hemoglobin, 85 per cent. normal. Proportion of white to red corpuscles, 1:621. Increase in red corpuscles of 925,000 per c.mm.; an increase in hemoglobin of 20 per cent. This case is reported as "apparently cured."

Vaughan early pointed out that the nucleins,

when introduced into the circulation, produced, in some manner not satisfactorily explained, a certain degree of leucocytosis, notably an increase in the number of the polynuclear cells, and to this action has been attributed the potency of the nucleins in tuberculosis rather more than to any germicidal properties which they themselves may possess. This, to my mind, is the most logical explanation of the remedial action of the nucleins in tuberculosis. To demonstrate, with an attempt at accuracy, the degree of leucocytosis produced by the hypodermic injection of yeast nucleic solutions in tuberculosis, I made the following experiments upon six patients suffering from the disease, controlling the results by those obtained in the cases of two perfectly healthy adults (my wife and a trained nurse who kindly offered to assist me in this work). These experiments and observations were conducted with such attention to the details of technic as would insure for me the closest approach possible to perfect accuracy in results. In every instance the figures given represent the average of 256 cubic millimeters. This, in addition to the fact that the utmost care was taken regarding the dilution of the blood and the even mixture of the same, should, I believe, give a very exact estimation of the degree of leucocytosis produced, and the proportionate changes in the relative number of the mononuclear and polynuclear cells. Particular attention was paid to the state of the digestive organs, in order to insure the same conditions at the time of both examinations. The results were as follows:

#### SIX EXPERIMENTS UPON PATIENTS UNDER TREATMENT FOR TUBERCULOSIS.

*Experiment I.*—Before the injection, temperature, 99.1° F.; pulse, 76. Total number of leucocytes per c.mm., 10,900; number of mononuclear cells per c.mm., 5900; number of polynuclear cells per c.mm., 5000. Three hours after an injection of 50 minimis of 5-per-cent. solution of nucleic acid was given, temperature, 99.2° F.; pulse, 104. Total number of leucocytes per c.mm., 15,900; number of mononuclear cells per c.mm., 5600; number of polynuclear cells per c.mm., 10,300; increase in the total number of leucocytes per c.mm., 5000; loss in the number of mononuclear cells per c.mm., 300; increase in the number of polynuclear cells per c.mm., 5300.

*Experiment II.*—Before the injection, temperature, 98.8° F.; pulse, 84. Total number of leucocytes per c.mm., 13,100; number of mononuclear cells per c.mm., 6250; number of polynuclear cells per c.mm., 6850. Five hours after an injection of 50 minimis of a 5-per-cent. solution of nucleic acid was given, temperature, 99.6° F.; pulse, 84. Total

number of leucocytes per c.mm., 18,100; number of mononuclear cells per c.mm., 5950; number of polynuclear cells per c.mm., 12,150; increase in the total number of leucocytes per c.mm., 5000; loss in the number of mononuclear cells per c.mm., 300; increase in the number of polynuclear cells per c.mm., 5300.

*Experiment III.*—Before injection, temperature, 99.6° F.; pulse, 104. Total number of leucocytes per c.mm., 9050; number of mononuclear cells per c.mm., 3750; number of polynuclear cells per c.mm., 5300. Five hours after an injection of 50 minimis of a 5-per-cent. solution of nucleic acid was given, temperature, 101.3° F.; pulse, 104. Total number of leucocytes per c.mm., 17,800; number of mononuclear cells per c.mm., 6550; number of polynuclear cells per c.mm., 11,250; increase in the total number of leucocytes per c.mm., 8750; increase in the number of mononuclear cells per c.mm., 2800; increase in the number of polynuclear cells per c.mm., 5950.

*Experiment IV.*—Before injection, temperature, 98.4° F.; pulse, 68. Total number of leucocytes per c.mm., 10,300; number of mononuclear cells per c.mm., 5650; number of polynuclear cells per c.mm., 4650. Four hours after an injection of 50 minimis of a 5-per-cent. solution of nucleic acid, temperature, 98.4° F.; pulse, 84. Total number of leucocytes per c.mm., 11,550; number of mononuclear cells per c.mm., 4400; number of polynuclear cells per c.mm., 7150; increase in the total number of leucocytes per c.mm., 1250; loss in the number of mononuclear cells per c.mm., 1250; increase in the number of polynuclear cells per c.mm., 2500.

*Experiment V.*—Before injection, temperature, 99.3° F.; pulse, 112. Total number of leucocytes per c.mm., 9050; number of mononuclear cells per c.mm., 6550; number of polynuclear cells per c.mm., 2500. Five hours after an injection of 50 minimis of a 5-per-cent. solution of nucleic acid, temperature, 101° F.; pulse, 120. Total number of leucocytes per c.mm., 11,850; number of mononuclear cells per c.mm., 3100; number of polynuclear cells per c.mm., 8750; increase in the total number of leucocytes per c.mm., 2800; loss in the number of mononuclear cells per c.mm., 3450; increase in the number of polynuclear cells per c.mm., 6200.

*Experiment VI.*—Before injection, temperature, 102.6° F.; pulse, 120. Total number of leucocytes per c.mm., 17,150; number of mononuclear cells per c.mm., 5300; number of polynuclear cells per c.mm., 11,850. Five hours after an injection of 50 minimis of a 5-per-cent. solution of nucleic acid, temperature, 101.1° F.; pulse, 112. Total number of leucocytes per c.mm., 19,050; number of mono-

nuclear cells per c.mm., 10,000; number of polynuclear cells per c.mm., 9050; increase in the total number of leucocytes per c.mm., 1900; increase in the number of mononuclear cells per c.mm., 4700; loss in the number of polynuclear cells per c.mm., 2800.

#### TWO CONTROL EXPERIMENTS UPON HEALTHY ADULTS.

*Experiment I.* — Before injection, temperature, 98.8° F.; pulse, 80. Total number of leucocytes per c.mm., 6250; number of mononuclear cells per c.mm., 2500; number of polynuclear cells per c.mm., 3750. Five hours after an injection of 50 minims of a 5-per-cent. solution of nucleic acid, temperature, 99.3 F.; pulse, 84. Total number of leucocytes per c.mm., 33,400; number of mononuclear cells per c.mm., 12,800; number of polynuclear cells per c.mm., 20,600; increase in the total number of leucocytes per c.mm., 27,150; increase in the number of mononuclear cells per c.mm., 10,300; increase in the number of polynuclear cells per c.mm., 16,850.

*Experiment II.* — Before injection, temperature, 98.4° F.; pulse, 65. Total number of leucocytes per c.mm., 5300; number of mononuclear cells per c.mm., 2800; number of polynuclear cells per c.mm., 2500. Five hours after an injection of 50 minims of a 5-per-cent. solution of nucleic acid, temperature, 99.4° F.; pulse, 84. Total number of leucocytes per c.mm., 21,850; number of mononuclear cells per c.mm., 6550; number of polynuclear cells per c.mm., 15,300; increase in the total number of leucocytes per c.mm., 16,550; increase in the number of mononuclear cells per c.mm., 3750; increase in the number of polynuclear cells per c.mm., 12,800.

It will be observed that in these experiments the presence of yeast nuclein in the circulation produced leucocytosis in every instance; that in every instance, except one, the increase was markedly in favor of the polynuclear cells, which we may now regard as phagocytes; that where no morbid influences existed the phagocytosis was infinitely more marked, as was the general leucocytosis, there being (in the two control experiments) an increase in leucocytes of about 540 per cent. in the one case, and 412 per cent. in the other within five hours after an injection of 50 minims of a 5-per-cent. solution of nucleic acid was given; and, finally, that during the exacerbations of a septic fever, when there is a pathologic leucocytosis, the effect of the nuclein is less marked, but quite in accord with the physiologic process.

I have made numerous other experiments and observations respecting the action of the nucleins in tuberculosis, some of them of considerable interest,

but the limits of this article have been already reached, and my conclusions must be drawn from those which have already been reported.

My conclusions, then, are as follows: (1) Nuclein is in no sense of the word a *specific in tuberculosis* but a perfectly logical remedy which acts in unison with, and as a stimulant to, the physiologic function of animal resistance to the invasion of disease. (2) Indirectly (probably) nuclein acts as a stimulus to constructive metamorphosis, as may be seen by the increase in the number of red blood-corpuscles, and in the percentage of hemoglobin which follow its repeated injection. (3) The hypodermic employment of nuclein (excepting in the presence of idiosyncrasies) is well borne by the great majority of patients, and is not contraindicated in any stage of tuberculosis, although in those cases far advanced in the disease success, beyond allaying distressing symptoms, need not be expected. (4) The most satisfactory results in tuberculosis are to be obtained from injections of moderate size made in a single dose once daily. (5) Administration of the nuclein per os is of very doubtful benefit, and should be employed only as an adjunct to their hyperdermic use, or when circumstances preclude the possibility of the latter method being adopted. (6) Success in nuclein medication in tuberculosis in the great majority of cases can only be expected to follow a continued treatment extending over a considerable period of time. (7) The same care and attention should be bestowed upon the general supportive treatment when nuclein is used as when any other method of treatment is employed. (8) Finally, nuclein medication has given far better clinical results in tuberculosis (by actual statistics) than any other medicinal agent heretofore employed in the treatment of this disease.

In closing this report I desire again to call attention to the fact that, while nuclein has passed the stage of a medical "fad," it is still a comparatively new remedy which must be critically discussed by the profession. Those who employ it should be alert of observation, strict in their clinical records and conservative in forming conclusions. By observance of these precautions we may hope through a multitude of counsel to attain wisdom as to the true status of the nucleins in medicine.

**More Dispensaries in New York Seeking Incorporation.** — It is reported that the following institutions have filed applications for certificates of incorporation with the State Board of Charities: The St. Bartholomew's Clinic connected with St. Bartholomew's Episcopal Church, New York city; the hospital and dispensary of the Pasteur Institute of New York city, and the Rayson Day Nursery of New York city.

## CLINICAL MEMORANDA.

## APPENDICITIS WITH APHASIA.

BY W. C. COLE, M.D.,  
OF JACKSONVILLE, ILL.

ON December 6, 1893, I was called to see Samuel A., about thirty-two years of age, who, though not rugged, had always enjoyed good health. He was suffering from severe abdominal pain, which was most intense in the right iliac region. His temperature was 100° F. I gave anodynes sufficient to control pain, a cathartic and febrifuges, and ordered hot applications externally. My diagnosis was perityphlitis. The active symptoms lasted about ten days, during which time anodynes were required for the pain; otherwise, the patient was treated tentatively. He made an uneventful recovery, though a hard tumor about the size of a small lemon remained in his right groin for several months.

On July 14, 1894, seven months afterward, he came into my office complaining of colic. Without much examination or questioning I treated him, and gave him instructions to keep as quiet as possible, and if not better soon to let me hear from him. Four days later I was called, and again found him suffering intensely from pain in the right iliac region. He had considerable fever. In the course of a week a well-defined enlargement was easily made out over the seat of the appendix vermiciformis. The patient now had become somewhat delirious and was difficult to manage. He was having frequent rigors, and his temperature was 103° F. On August 1st I aspirated the tumor and withdrew three-fourths of a pint of creamy-looking pus, and on the following day repeated the operation, again removing considerable pus.

At this juncture the patient appeared to recover to a considerable degree from his delirium, and in its stead a condition of aphasia developed. Dr. C. E. Black then saw the patient with me. We opened the abscess cavity freely and washed it out thoroughly with an antiseptic solution, repeating the washings two or three times a day for about six weeks. A few days after the opening of the abscess symptoms of paralysis of the entire right half of the body began to show themselves. The right lower extremity became very painful, and the leg from the knee downward was very much swollen. The patient during these six weeks was unable to make himself understood, except by motions, grunts, and grimaces. The evacuations from the bowels and bladder were almost continuously involuntary for a period of three or four weeks. About two weeks after the operation a tender spot appeared on the bottom of the heel of the right foot, which continued to extend in size until finally an oval-shaped piece, two by four inches became gangrenous and sloughed to a depth almost reaching the bone. I should have stated that, preceding the delirium, the patient complained for several days of a severe headache, especially affecting the back part of the head and neck.

It is now two and one-half years since the man developed this condition, and he still has slight aphasia, being unable at times to call persons or things with

which he is familiar by their proper names. He also complains of some numbness in the right hand and foot, and says they are nearly always cold, or colder than the other side of the body. We are unable to determine just what part of the brain is affected, but, following the description of similar cases in which autopsies have been made, we feel safe in saying that the lesion is located in the lower posterior third of the left side.

## REPORT OF AN INTERESTING CASE OF PNEUMONIA.

BY G. METZLER, M.D.,  
OF PHILADELPHIA.

ON April 28, 1897, at 8 A.M., I was called to see John B., six years of age, who complained of severe pain in the cardiac region. On examination of the chest there was seen in the region of the heart an area, about the size of a hand, discolored blue. As the boy complained so much of pain, and as the dyspnea was so severe, a further examination of the chest was not then made. A towel wrung out in cold water was wrapped around the chest, encircling it three times. This was covered by a piece of blanket of the same size. The effect of this application was remarkable; the pain ceased at once, and the patient fell asleep. His temperature at that time was 101.3° F. It was learned from the parents that he had vomited severely, which was probably the cause of the blue discoloration in the cardiac region, either from venous engorgement, or more likely from the rupture of a small venule.

The patient was again seen at 5 P.M., and it was then possible to examine the entire chest. This examination revealed the presence of an infiltration of the left lower lobe of the lung, with all the accompanying symptoms of croupous pneumonia. The wet application to the entire chest was continued, and, in addition, an icebag was placed over the cardiac region, because it was suspected that the pericardium was implicated in the inflammatory process. The heart sounds, clear in the morning, were somewhat muffled in the evening. Internally, one-sixteenth of a grain of calomel was given every hour, and one-half drop of tincture of aconite every three hours. The temperature was 104.3° F. The following morning the dyspnea was still intense. The boy complained of a little pain in the region of the heart. On examination of the chest it was found that the right lower lobe of the lung was also affected. In the evening the patient was more calm and the dyspnea less intense. It was learned that he had perspired a little. Temperature, 103° F.

The next morning, April 30th, the whole scene was changed. There was no dyspnea and no pain. His temperature was 101° F. There was a mitral murmur. The boy coughed now more than during the two previous days, and the sputum was streaked with blood. He was given tincture of digitalis (two drops) in elixir of cinchona, every three hours. The mitral murmur disappeared after three days.

The case seems worthy of note, because of its peculiar beginning, its rapid termination, and the decidedly benevolent action of the hydropathic treatment. In a disease

so prevalent as pneumonia, and in which there is so little agreement between physicians as to the proper treatment, it seems that one is not only justified, but should be obliged to make public his experience in the treatment of just such cases as this one. Opium, venesection, dry or wet cups are recommended to relieve pain. I have used all these measures, and in some cases with good results. Bloodletting, however, in any form is not advisable in the case of a child; and as regards opium, this drug may be used, but if there are other measures which give equal beneficial results they should be used instead, as any interference with the excretory powers of the economy may lead to a fatal turn of the disease. In a disease which is determined in a few days, for good or for bad, it is all-important to keep the excretory organs in good condition, and, if need be, to stimulate them, so as to give free vent to the toxins circulating in the organism.

## MEDICAL PROGRESS.

*The Anatomy of the Ureters.*—According to SCHWALBE in the *Centralbl. f. d. Med. Wissenschaft.*, Nov. 21, 1896, the human ureter is properly to be considered as having an abdominal and pelvic portion; in the former there is constantly present a fusiform dilatation lying just above the pelvic brim, called the greater dilatation. At its upper end, usually distant from the pelvis of the kidneys about seventy millimeters, is the narrowest part of the ureter, the "superior isthmus." At the junction of the abdominal and pelvic portions is the "inferior isthmus."

In the pelvic portion of the ureter, smaller fusiform dilatations can also be demonstrated. The right ureter is shorter, and has a more marked superior dilatation than the left. In the female these characteristics are more distinct than in the male. The two portions of the ureter join each other at an angle of 135°. This angle is a little sharper on the right side.

Investigations in quadrupeds show that in them the ureter has throughout a uniform caliber with no angle at the pelvic brim. In animals, which sometimes assume a vertical position—for instance, monkeys—there is a slight angle, and also a very slight fusiform dilatation above it. As a result of these observations, Schwalbe concludes that the superior dilatation is to be regarded as a compensatory dilatation, produced by the obstruction to the flow of the urine caused by the angle at the pelvic brim.

*The Symptoms of Typhoid Lesions in the Large Intestine.*—When the lesions of typhoid fever predominate in the large intestine they usually produce a group of symptoms from which it is possible to recognize this special localization of the disease. These cases are rare, and a diagnosis is seldom made. According to HENRIOT, an abstract of whose study of this subject appears in the *Gaz. Heb. de Med. et de Chir.*, Nov. 22, 1896, the following symptoms are characteristic:

1. Diarrhea is the most common symptom. It is profuse, often involuntary, and very fetid, presenting in general the characteristics of ordinary typhoid stools, though these may be more watery and have less color.

2. Meteorism is a less valuable symptom, as it occurs in numberless cases of typhoid fever with lesions in the small intestine.

3. The pain is located sometimes at one point and sometimes at another, and sometimes throughout the whole course of the large intestine. This symptom is rarely absent when there are ulcerations, but it is often necessary to examine the patient with reference to its existence, and in certain cases abdominal pressure reveals its presence, although the patient does not complain of any tenderness if not disturbed.

4. The general condition is very bad.  
The prognosis in these cases is unfavorable.

## THERAPEUTIC NOTES.

### For Renal Colic.—

B	Lycetol	gr. xv
	Bicarbonate of soda	gr. viii
	M. Ft. Chart No. 1.	

To be taken morning and evening, dissolved in a glass of mineral water.—*Witzack.*

*How to Administer Oily Enemata.*—Oil has of late been administered by the rectum with good results to patients worn out by wasting diseases. The best method of administration is not yet agreed upon. Deucher, who has experimented extensively along this line, reports in the *Semaine Medicale*, April 9, 1897, that the maximum of absorption is attained with an emulsion of equal parts of oil and a solution of sodium carbonate to which is added a little sodium chlorid. The whole is administered at the temperature of the body.

### An Efficient Application for Psoriasis is the following:

B	Chrysarobin	gr. xx
	Ichthyol	aa
	Acid salicylic	gr. viii
	Oxid of zinc ointment	3 iiiss
	Vaseline	q.s. ad $\frac{1}{2}$ i

M. Sig. Remove scales and rub in ointment for half an hour. Leave the ointment on during the night and bathe in the morning.—*Unna.*

### A Useful Combination for the Pain of Herpes Zoster:

B	Alcohol	$\frac{1}{2}$ i
	Menthol	gr. xv
	Ext. cannabis indica	gr. xxv

M. Sig. Apply by means of pads made of wadding, which should be frequently renewed during the day.—*Leloir.*

### Furunculosis is benefited by the following plaster:

B	Acid salicylic	3 ii
	Soap plaster	gr. viii
	Diachylon plaster	gr. viii

M. Sig. Apply spread on cloth.—*Heitzman.*

### An Excellent Application for Pruritus of the Vulva:

B	Chloroform	3 ii
	Amygdalin oil	3 ii

M. Sig. Apply as necessary.—*Scanzoni.*

# THE MEDICAL NEWS.

## A WEEKLY JOURNAL OF MEDICAL SCIENCE.

COMMUNICATIONS are invited from all parts of the world. Original articles contributed *exclusively* to THE MEDICAL News will after publication be liberally paid for (accounts being rendered quarterly), or 250 reprints will be furnished in place of other remuneration. When necessary to elucidate the text, illustrations will be engraved from drawings or photographs furnished by the author. Manuscripts should be typewritten.

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SATURDAY, MAY 22, 1897.

### THE MALT EXTRACT OF THE PHARMACOPEIA AND THE MALT EXTRACT OF THE STREET-CARS.

An interesting article by Harrington, published in the *Boston Medical and Surgical Journal*, December 31, 1896, reminds us that the term malt extract was originally used to denote a honey-like substance extracted from malted barley, containing no alcohol, but having a high percentage of sugar and dextrin, and about two per cent. of the ferment diastase, one part of which will convert 2000 parts of starch to glucose and dextrin. On account of the last property it has been widely prescribed to assist the digestion of starchy food.

But this old definition of a malt extract, owing to the efforts of the brewers, has recently given way very largely to the idea that a malt extract is a liquid preparation, more or less effervescent, to be drunk by the glass or *ad libitum* with meals or on retiring. The value of these preparations in digestive, respiratory, nervous, and other troubles, and especially as a food for nursing mothers, is alleged with great vehemence in advertisements, while in every street-car are pictures of opera-singers, actors, professional beauties, athletes, warriors, and statesmen of both the Eastern and Western hemispheres, who attribute

their success in life to the unstinted use of one or the other of these preparations. An analysis of twenty-one of these extracts as made by Harrington is so instructive that it is printed in full:

TABLE I.

Brand.	Specific Gravity	Alcohol.	Total Residue.	Ash.
Beefmalt.....	1.0523	1.56	13.066	0.428
Gahm's Malt Extract.....	1.0156	6.67	6.328	0.232
Hercules Malt Wine.....	1.0378	6.07	11.634	0.528
Herculean Extract of Malt.....	1.0149	3.29	8.187	0.107
Hoff's (Eisner & Mendelsohn).....	1.0313	2.58	6.862	0.262
Hoff's (Tarrant's).....	1.0288	4.37	6.862	0.262
Leicester's English Malt Extract.....	1.0263	2.83	8.046	0.238
Liquid Bread.....	1.0168	5.37	6.186	0.214
Malt-Nutrine.....	1.0555	0.74	13.630	0.250
Malt Wine (Haffenreffer & Co.).....	1.0279	4.25	8.066	0.200
Menzel's Extract of Malt.....	1.0163	3.59	6.310	0.280
Mulford's Digestive Malt Extract.....	1.0106	1.31	6.632	0.250
Noris Extract of Malt.....	1.0387	3.88	11.455	0.256
Old Grist Mill Malt Extract.....	1.0383	3.82	11.060	0.260
Pabst Malt Extract.....	1.0280	4.10	8.666	0.312
Pasteurized Extract of Malted Barley.....	1.0136	3.88	5.280	0.230
Puremalt.....	1.0271	5.56	8.436	0.466
Teutonic.....	1.0286	6.28	9.458	0.398
Vitamalt.....	1.0222	4.69	7.206	0.264
Wampole's Extract of Malt.....	1.0257	7.13	9.534	0.386
Wyeth's Extract of Malt.....	1.0540	1.37	12.656	0.390

Diastase absent in all of the above brands.

TABLE II.

Brand.	Specific Gravity	Alcohol.	Total Residue.	Ash.
Milwaukee Beer.....	1.0173	4.12	6.220	0.182
Culmbacher Beer (Domestic).....	1.0305	5.06	9.742	0.362
Pale Ale (English).....	1.0064	5.62	4.080	0.344
Porter (Irish).....	1.0151	6.14	6.194	0.474

It will be observed that no one of these preparations contains a trace of diastase; that six of them contain over five per cent. of alcohol (more than ordinary beer contains), while only six of them have more sugar than domestic beer. Many of them contain salicylic acid. From an economic standpoint they possess no advantage over beer, ale, or porter. On the contrary, according to the size of the bottle and price asked, the consumer obtains for ten cents from 100 to 250 c.c. of malt extract; of imported ale or porter he obtains from 220 to 260 c.c., while of domestic beer he receives from 800 to 840 c.c.

### THE NEW YORK UNIVERSITY BELLEVUE HOSPITAL MEDICAL COLLEGE—ORGAN- IZATION OF THE FACULTY.

The announcement of the names of the men who will compose the faculty of this newly organized medical school has been awaited with no little expectancy, not only by the parties particularly interested, but by the whole profession. It was recog-

nized by all that the selection of a faculty was, under the circumstances, a most delicate procedure. There was no dearth of material ; on the contrary, the situation that confronted the appointing power was *l'embarras de richesses*. It was impossible to find positions for all the members of the two original organizations.

The point about which the keenest interest centered was whether the Council would be guided in each selection by the uncompromising spirit of the best man for the place, or whether its judgment would be swayed by such considerations as family and finance. The terms under which the consolidation was effected guaranteed fair and considerate treatment of both organized parties to the contract, and yet the necessities of the case demanded compromise. In such transactions the danger is that in the effort to satisfy all no one is pleased.

The plan adopted by the Council was a somewhat novel one, and displayed a master stroke of diplomacy in shifting the responsibility to the shoulders of the former professors and making each one of them actually elect, not only himself, but his fellows. This was accomplished by inviting each professor to send in a confidential ballot nominating members of a complete faculty, it being understood that he himself was already in nomination for his own chair. The selection was not to be limited to the faculties of the two colleges, or to New York city. Nominations were thus made for the forty-one professorships in the nineteen departments of the consolidated institution. In the two faculties there had been fifty professors. The result of the balloting was that nine-tenths of the faculty chosen by the university corporation received the support of a majority of both the old faculties. Six members were made professors emeritus, five of whom were active professors last year.

In a delicate negotiation of this nature it is inevitable that there will be some disappointments, but, on the whole, it must be acknowledged that the Council has met the ordeal in a manner that commands the approval of every candid critic.

This new institution may now be considered organized ; it only remains to adjust the details of its domestic economy, adapt its present buildings to the new exigencies, and erect such additional structures as the new conditions require.

Extensive plans for new buildings are under consideration. Since the consolidation of the two colleges, the University has acquired a large additional plot of ground on Twenty-fifth street, just south of the buildings already owned by it. This plot measures 100 feet in depth by 175 feet in length. The plan for its improvement contemplates two courts with an east building, a center building, and a south building. The center and east buildings will be erected soon.

Henceforth New York city will possess two of the largest and best-equipped medical schools in this country, if not in the world : the College of Physicians and Surgeons on the west side of the city and the newly organized institution on the east side. Each is provided in its immediate vicinity with ample hospital facilities and abundant clinical material ; each one has allied itself with a strong and wealthy university ; the requirements for admission and graduation are equally exacting, and on the parallel lines along which they must inevitably develop, a healthy, generous rivalry will stimulate to the loftiest ambitions and the noblest aims.

## ECHOES AND NEWS.

**A New Remedy for Gout.**—An English physician claims that regular daily traveling in railway cars has a hygienic value, and is especially beneficial in cases of gout.

**The International Congress at Moscow.**—It is announced that the Russian railways have generously decided to grant free passes to members of the Congress, thus greatly reducing the expenses of the journey.

**A "Kneipp Cure" Sanitarium in Vermont.**—The American Kneipp Cure Company of New Jersey, proposes to open its first Kneipp-cure sanitarium at Middletown Springs, Vt. The company is capitalized at \$1,000,000. Middletown Springs is now a popular summer resort known for pure air and water, and the Kneipp-cure people propose to change the name to Kneippville.

**The New York Morgue-Keeper Found Guilty.**—The Board of Charities has reached a decision in the case of Morgue-Keeper Albert M. White, who was tried by the board three weeks ago on a charge preferred on December 5, 1896, that he had illegally disposed of bodies committed to his care. The members of the board are unanimous in the decision that White is guilty as charged, and they have dismissed him from his position.

**Extraordinary Death of a Physician.**—Dr. Carrier of Varannes, France, has recently died under painful circum-

stances. The daughter of a patient to whom he had given a hypodermic injection of morphin, seeing her mother very quiet, thought she was dead, and cried out that the doctor had poisoned her. Dr. Carrier was seized with a fainting fit, and, as he fell, struck his head against the mantelpiece, receiving injuries which resulted in his death a few hours later, just as the patient awoke, much relieved by her peaceful sleep.

**The Roentgen Ray in Surgery.**—At the Instituto Fisico of the university at Pavia, Italy, the entire tibia of the left leg of a boy patient having been removed, a series of object lessons on the reproduction of the lost bone were initiated, with the help of the Röntgen ray. The organic functions of the osseous tissues, as illustrated in the reproductive process, were watched and registered at stated intervals, and the value of the Röntgen ray in surgical diagnosis and treatment, and equally in surgical teaching, was vindicated in the most striking manner.

**Report of New York Prison Commission.**—In the recent report of the State Commission on Prisons regarding the condition of the penal institutions of New York city are some statements of unusual interest. The investigation revealed the fact that only five per cent. of the youths between the ages of sixteen and nineteen awaiting trial before the courts of New York are sent to the Tombs. Ninety-five per cent. of these youthful offenders are cared for by Mr. Gerry's society. In the Kings County Penitentiary, the commission reports, the bath-rooms are new and excellent, being so arranged that, while forty may bathe at the same time, each person is in a separate booth, or stall, with a separate dressing closet for each; yet all are subject to the surveillance of the keepers. The plan could well be copied in other prisons.

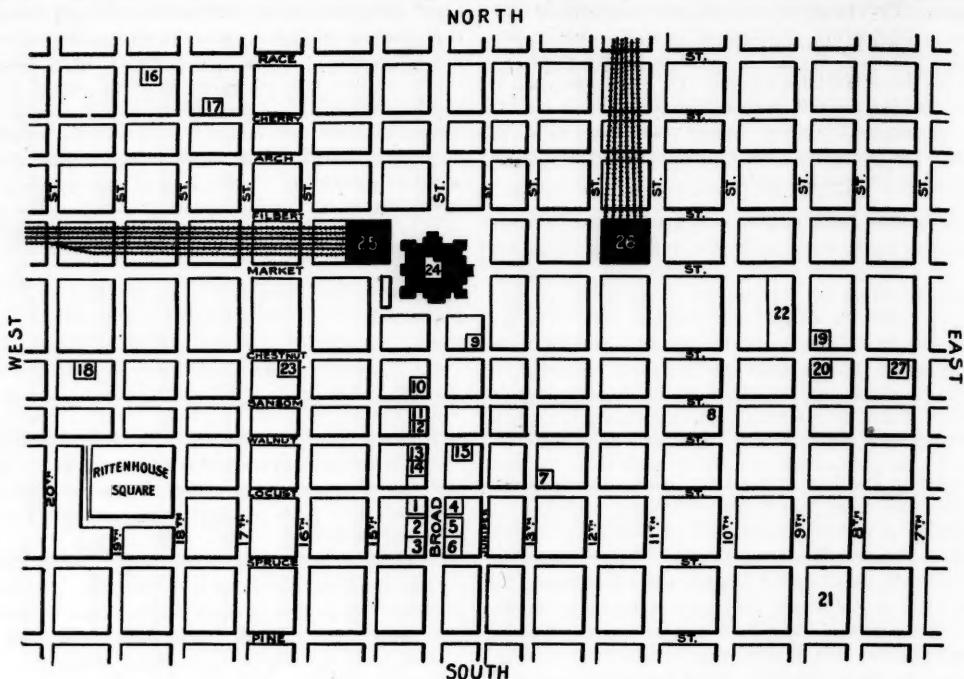
**Parrots as Sources of Tubercular Infection.**—Bronchopneumonia has assumed almost an epidemic form in Genoa, Italy, caused, it is believed, by infected parrots brought from Brazil. Fourteen persons have been attacked by it, and eight have died. The susceptibility of the parrot to all lung diseases, above all to tuberculosis, is being widely discussed by the medical journals. In Berlin the profession has long been alive to the danger of harboring and petting the parrot, as the malady is often hereditary in the bird, and is aggravated by the close confinement of the voyage to Europe—even after arrival it is, for the most part, exposed to unsanitary conditions, under which it contracts tuberculosis and bronchopneumonia from human sufferers from these ailments. The Veterinary School has had 154 parrots under observation, and fifty-four of them have been found, by bacteriologic tests, to be suffering from advanced tuberculosis.

**Mr. Lawson Tait and Hospital Abuse.**—The Birmingham Daily Post gives Mr. Lawson Tait's views on hospital reform: "We (the profession) are entirely responsible for hospitals, and for all their faults as well as their merits." He maintains that the medical officers of the Birmingham Hospital could make an end of the trouble in a month. As a temporary expedient, he suggests that they should

assign thirty per cent. of their income accruing from hospital positions for the assistance of their "struggling extra-mural brethren." The *Lancet*, commenting on this says: "We are sure the 'struggling brethren' would decline any such remedy. All they ask from their hospital colleagues is to use their influence to restrict the benefits of hospital treatment to those who need it and cannot afford to pay for it. Neither is it of any use to lay the whole blame on hospital honorary officers. The committees and governors of hospitals are equal, or greater culprits."

**Obituary.**—Dr. George W. Burdett died in Clinton, Mass., May 10th. He was seventy-six years of age, and was a graduate of Dartmouth Medical School and of Harvard Medical School. He was for many years a member of the Board of Directors for the Bigelow Free Public Library, and had been Master of the Trinity Lodge of Free and Accepted Masons.—Dr. Elisha Munger of New London, Conn., died May 14th, after ten weeks of suffering, following an operation for appendicitis. He was forty-nine years old, and for a quarter of a century practised medicine in New London county, commencing at East Lynn, and afterward removing to the city, where he had lived for nine years.—Dr. Magitot, who was the founder in France of modern dentistry, and wrote many important works upon the development of the teeth, died recently very suddenly during an attack of angina pectoris. He was a member of the Academy of Medicine, and had been president of the Society of Anthropology.—Mr. Louis Pascal Casella died at Highgate, England, April 23d, aged eighty-six years. Mr. Casella was the first to construct a registering clinical thermometer.

**A Controversy in the Medical Society of New Haven, Conn.**—On the Faculty of the Yale Medical School is Dr. B. A. Cheney, whose father is a homeopathic physician. The younger physician has made repeated attempts to become a member of the regular local society, and, it is asserted by his friends, has been unjustly kept out on the alleged ground of homeopathic affiliations. One of the prominent physicians opposing Dr. Cheney's admission has been Dr. F. E. Beckwith of New Haven, one of the leading obstetrical specialists in the State, and formerly connected with the Yale Medical School. At a recent meeting of the Medical Society Drs. Osborne and L. W. Bacon of the Yale School, as a counter-thrust, and with the evident intent of carrying the war into Africa, preferred charges against Dr. Beckwith of consultation with local homeopathic physicians. The charges were referred to a committee of three, which found that Dr. Beckwith had consulted with homeopaths only in emergency cases, and reported by a majority vote in his favor, one of the committee, however, favoring expulsion. The vote of the society stood 33 to 17 in Dr. Beckwith's favor. A striking feature of the case was the appearance of Dr. Francis Bacon as leading defender of Dr. Beckwith, while Dr. L. W. Bacon, his nephew, in the Yale Medical School, led Dr. Beckwith's foes. To a disinterested observer the affair has the flavor of a tempest in a teapot, and carries the earmarks of personal retaliation.



MAP INDICATING POINTS OF INTEREST AT THE COMING MEETING OF THE AMERICAN MEDICAL ASSOCIATION AT PHILADELPHIA.

REFERENCES TO THE ABOVE MAP.

1. Academy of Music.
2. Horticultural Hall.
3. Beth-Eden Church.
4. Hotel Walton.
5. South Broad Street Theater.
6. Hotel Stenton.
7. College of Physicians.
8. Jefferson Medical College and Hospital.
9. U. S. Mint.
10. Lafayette Hotel.
11. Union League Club.
12. Hotel Bellevue.
13. The Stratford Hotel.
14. The Art Club.
15. University Club.
16. Wills Eye Hospital.
17. Medico-Chirurgical College.
18. Aldine Hotel.
19. Girard House.
20. Continental Hotel.
21. Pennsylvania Hospital.
22. Post-office Building.
23. Colonnade Hotel.
24. Public Buildings.
25. Pennsylvania Railroad Depot.

26. Philadelphia & Reading Depot.

27. Publication office *The American Journal of the Medical Sciences*, Lea Bros. & Co.

MEETING PLACES.

General Meetings, Academy of Music; hours, 10 A.M. to 1 P.M. daily.

Registration Office, Horticultural Hall (lower corridor). Post-office, Horticultural Hall (outer vestibule).

SECTIONS.

Practice of Medicine, Broad Street Theater.

Surgery and Anatomy, Horticultural Hall (lower hall).

Obstetrics and Gynecology, Beth-Eden Church.

Neurology and Medical Jurisprudence, Beth-Eden Church (upper room).

Ophthalmology, Hotel Walton (tenth floor).

Laryngology and Otology, Hotel Walton (tenth floor).

Materia Medica and Pharmacy, Academy of Music (Blue Room).

Diseases of Children, Academy of Music (Foyer).

State Medicine, Academy of Music (Red Room).

Dermatology and Syphilography, Horticultural Hall (Foyer).

Physiology and Dietetics, Hotel Stenton.

Dental and Oral Surgery, Hotel Walton (Parlor D).

All Sections meet at 9 A.M. and 3 P.M.

The exhibition of books, pharmaceutical preparations, and surgical instruments will be given in the main hall, Horticultural Hall, immediately adjoining the Academy of Music.

*Notes of Interest Regarding the Coming Meeting of the American Medical Association at Philadelphia.*—The semi-centennial meeting of the American Medical Association will take place at Philadelphia on Tuesday, Wednesday, Thursday and Friday, June 1<sup>st</sup> to 4<sup>th</sup>. The general meeting will be opened on Tuesday by the introduction of the venerable Dr. Nathan S. Davis, of Chicago, attended by the presidents of the State medical societies, and he will deliver an address, entitled "A Brief History of the Origin of the American Medical Association, the Principles on which it Was Organized, the Objects it Was Designed to Accomplish, and How far they Have Been Attained during the Half-Century of its Existence." The President of the Association is Dr. Nicholas Senn of Chicago, and the First Vice-President Surgeon-General George M. Sternberg.

It is expected that nearly 3000 delegates will attend this memorable meeting, and the profession of Philadelphia has made great preparations for their reception, not only from a social, but even more particularly, from a scientific standpoint. Arrangements have been made for special courses at the various colleges so that delegates may, however briefly, become acquainted with recent medical processes. The committee in charge has found it possible to arrange for the general and sectional meetings to take place in the buildings situated within a single block on Broad street, *i. e.*, that block extending from Locust street to Spruce street. The position of these various buildings, and of the different hotels which offer special rates to the members of the Association, is shown on the accompanying map, which may prove of much use to those readers of *THE MEDICAL NEWS* who intend to be present at the meeting. At the southeast corner of Broad and Locust streets is situated the Hotel Walton which will be the headquarters of the Association and in which three of the sections will meet. Immediately adjoining it to the south is the Broad Street Theatre with a large seating capacity which will be devoted to the Section of Practice of Medicine. Adjoining it to the south is the Hotel Stenton in which the meetings of the Section of Physiology and Dietetics will be held. Immediately opposite, at the northwest corner of Broad and Spruce streets, is the Beth-Eden Church, which, in addition to its ordinary accommodations, contains a large meeting-room. This building will be used by the sections of Obstetrics and Gynecology, and of Neurology and Medical Jurisprudence. Immediately across from the Broad Street Theatre is Horticultural Hall, a newly erected building, exceedingly handsome in its inside and outside decoration, the main hall of which will be devoted to exhibition purposes. This hall also contains two large meeting-rooms which will be devoted to the sections of Surgery and Anatomy and of Dermatology and Syphilography. Finally, the Academy of Music, immediately adjoining Horticultural Hall, and which is capable of seating nearly 3000 persons, has been engaged for the general meeting. Smaller rooms in the same building will be used for the sections of Diseases of Children, of Materia Medica and Pharmacy and of State Medicine.

These places of meeting are also situated close to the Col-

lege of Physicians at the corner of Locust and Thirteenth streets, an institution which has the largest medical library in the United States next to that of the Surgeon-General's Office at Washington. Most of the important clubs are also within a few hundred yards of the hotel headquarters. It will also be noticed that the meeting places are but three blocks away from the Broad Street Station of the Pennsylvania Railroad and but four blocks from the Terminal Station of the Reading Railroad.

Several luncheons will be given each day under various auspices. The dinners of the various sections will take place on Tuesday evening at 7 o'clock, and on Wednesday evening the University of Pennsylvania, the Union League Club, Jefferson Medical College, the Academy of Fine Arts and other institutions will hold receptions. On Thursday afternoon the Provost of the University of Pennsylvania, Mr. C. C. Harrison, will receive the delegates on the campus of the University, and several private lunches will also be given on the same day. The publishers of the *MEDICAL NEWS*, Messrs. Lea Brothers & Co., have invited the visiting delegates and their wives to a theater-party on Thursday evening, at the Broad Street Theatre, at which refreshments will be served. On Friday the Philadelphia Medical Club will give a luncheon at the Hotel Aldine, and on that afternoon the meeting will come to a close.

*Vital Statistics in England and Wales.*—The Registrar-General of Births, Deaths, and Marriages in England and Wales has just issued his report for 1895. The following are some of the more generally interesting facts contained in it. The population was 30,383,047—14,721,820 males and 15,661,227 females. The number of marriages registered was 228,204, corresponding to a rate of 15 persons married per 1000 living, against 15.1 per 1000 in the previous year, and an average of 14.9 in the ten years 1885-'94. The slight fall in the marriage-rate, as compared with that of 1894, was accompanied by a rise of 4 per cent. in the value of British exports, a rise of 1 per cent. in the value of imports, and a rise of 1 per cent. in the average price of wheat per quarter. Of the 228,204 marriages, 156,469, or 686 per 1000, were celebrated according to the rites of the Church of England, and 71,735, or 314 per 1000, otherwise. These proportions are exactly the same as those of 1894. Of each 1000 men married during the year 1895, 891 were bachelors and 109 widowers; of each 1000 women married, 924 were spinsters and 76 widows. The births registered during the year numbered 922,291, and were equal to a rate of 30.4 per 1000 persons living, or .8 below the average rate in the preceding ten years. The births of males numbered 468,886, and the births of females 453,405, the former bearing to the latter the proportion of 1034 to 1000, against an average proportion of 1037 to 1000 in the preceding decennium. The excess of male over female births has shown a general tendency to decline ever since the year 1841. The deaths registered during the year numbered 568,997, and were in the proportion of 18.7 per 1000 of the population. Although the rate showed an increase of 2.1 per 1000 upon the unprecedeted low

rate of 1894, it was slightly below the mean rate (18.9) of the ten preceding years 1885-'94. The 568,997 deaths included 290,704 males and 278,293 females. The death-rate among males was therefore equal to 19.7, and that among females to 18.7 per 1000 living of the corresponding sex. Out of equal numbers living there were 1111 deaths of males to 1000 deaths of females, against a mean proportion of 1121 in the ten years 1885-'94.

## CORRESPONDENCE.

### OUR PHILADELPHIA LETTER.

[From our Special Correspondent.]

JEFFERSON MEDICAL COLLEGE COMMENCEMENT—CLASS-DAY EXERCISES AT THE MÉDICO-CHIRURGICAL COLLEGE—DR. W. S. HALSTED—A PAY-HOSPITAL FOR CONTAGIOUS DISEASES—A SUMMER LABORATORY COURSE.

PHILADELPHIA, May 15, 1897.

THE seventy-second annual commencement of the Jefferson Medical College was held in the Academy of Music on May 14th, and the degree of Doctor of Medicine conferred upon 161 members of the graduating class by the Hon. William Potter, President of the Board of Trustees. The opening prayer was made by the Rev. Allen B. Philputt, D.D., and an address was delivered by the Rev. Francis L. Patton, President of Princeton University, whose remarks contained much that may be remembered with profit by the newly graduated physicians. Prof. E. E. Montgomery gave the valedictory to the class. He spoke of the value of the graded curriculum which they had followed, contrasting its advantages with the training received by medical students in years past, and referred to the long list of men famous in medicine and in surgery, who have helped to give to their *alma mater* her enviable position among medical schools.

The annual banquet of the Alumni Association of the Jefferson Medical College was given on the evening of May 13th, at the Hotel Bellevue. Dr. H. A. Hare, the toast-master of the evening, introduced Mr. James P. Townsend, who spoke for the Board of Trustees. Dr. A. H. Hulshizer made a report on the fund for the equipment of the new pathological laboratories of the college, which showed that a total of \$7000 had been subscribed for this purpose. Other speeches were made by Dr. George McClellan, who responded to the toast, "The Alumni Association"; by Mr. Hampton L. Carson, giving a sketch of the famous medical men of Philadelphia from Penn's time to the present day; by Prof. W. W. Keen, for the faculty; by Prof. H. A. Wilson, for the clinical faculty, and by Dr. E. Q. Thornton, on behalf of the demonstrators of the college. Several hundred alumni were present, and the banquet was considered one of the most successful ever held.

As a prelude to the commencement exercises of the Medic-Chirurgical College, to be held next week, the Class-Day exercises of the graduating class of this institution were observed on May 13th. Speeches were made by Prof. Isaac Ott, Dean of the Faculty, and by Messrs. A. C. Morgan, the Class President; J. A. McKenna, the

Class Historian, and A. C. Buckley, the Valedictorian. A dinner and reception were given to Dr. William S. Halsted of Baltimore, on May 13th, by Dr. W. W. Keen, at the University Club.

At a meeting of the Philadelphia County Medical Society, held on May 12th, Dr. J. Madison Taylor, Chairman of the Joint Committee of the County Medical Society, and the Woman's Health Protective Association of Philadelphia, on the proposed pay-hospital for contagious diseases, made a report of the work accomplished by this body toward securing this much-needed institution. The site recommended for the hospital is that at present occupied by the Municipal Hospital for Contagious Diseases, in a section of the city where, by reason of the proximity of two railroads, a residence neighborhood is unlikely to be built up. The need of a pay-hospital of this kind, where patients may be attended by their own physicians, was shown to exist, and encouraging progress in the movement was reported.

Dr. Edward Rosenthal read a paper on "The Municipal Hospital of Philadelphia," in which he described the new diphtheria pavilion, which has recently been added, and suggested other improvements, notably a building for suspected cases, and also the purchasing of more ground adjacent to the institution, to be used temporarily as a park for the patients. In the discussion of Dr. Rosenthal's paper, a communication from Dr. Benjamin Lee was read, highly praising the diphtheria pavilion, and suggesting that, as the State Board of Health had decided to place measles among the diseases to be quarantined, a building for this class of patients should be provided, in order to prevent their coming in contact with other contagious diseases. Dr. William Welch spoke of the need of money for necessary improvements at the Municipal Hospital, and urged that smallpox cases be cared for in a building in some remote locality. On motion by Dr. John Ashurst, Jr., a committee was appointed to draft a resolution of the Society's approval of the present site of the Municipal Hospital, and requesting the city councils to make more liberal appropriations to carry on the work of treating the city's cases of infectious disease.

A summer laboratory course, lasting from May 1st until July 1st, has been inaugurated at the Medic-Chirurgical College, under the direction of Prof. Joseph McFarland. The work, which is open to both undergraduate and post-graduate students, includes bacteriology, morbid anatomy and histology, autopsies, toxicology, medical chemistry, and clinical microscopy.

### OUR VIENNA LETTER.

[From our Special Correspondent.]

KOCH'S RECENT PUBLICATION ON TUBERCULIN AND AUSTRIAN OPINIONS OF IT—THE THYROID AND CONGENITAL ANOMALIES—THE BOTANIC SPECIFIC PATHOGENEITY OF MICROBES TO BE DISCUSSED AT THE INTERNATIONAL MEDICAL CONGRESS AT MOSCOW—VASELIN FOR ERYsipelas—DOCTORS' FEES IN VIENNA.

VIENNA, April 15, 1897.

THE interest displayed in Vienna in Koch's latest publication on tuberculin and its diagnostic and therapeutic

possibilities serves to show the prominent position the "Dean of Bacteriology" occupies in the German medical world. Every one of the many Viennese medical journals published detailed abstracts from the report within a few days of its appearance, and most of them in addition had editorial comments. The very limited applicability, as far as therapeutics are concerned, claimed for the tuberculin, even by its inventor, seems to be a source of general disappointment. The proofs of its diagnostic value very early in the course of tuberculosis, before the slightest positive physical signs are present, are very cordially welcomed. Vienna, whose death-rate from tuberculosis is comparatively very high, ought to furnish an excellent field for the confirmation and further development of this part of the master's work.

The attitude of the political press in the matter seems worthy of note. Most of the papers have printed notices and comments, but usually in but few words. Some of them, however, do not seem ready to forget their over-reaching enthusiasm when the first announcement of the discovery of tuberculin was made some six years ago, and the melancholy disappointment which followed it. There have been some sarcastic comments. One of the journals suggests that the date of the publication, April 1st, is not without significance, and that it is not this time to be taken too seriously. One of the comic papers, in a rhymed skit, announces a cure for tubercle, but not in men; only in rabbits and guinea-pigs. It is the old story the world over: the public generally cannot appreciate the slow and sure progress of true science, but demand immediate results and carp at the little that each advance really means while there still remains so much to be done. Notoriety is the earmark of humbug, and the press, in default of something better, is ready to exploit the latest medical fad or the pet theory of someone who is not as visionary as he seems, but has an eye only for the main chance. It is reassuring and not wholly without a sense of compensatory universality that one finds that the spirit is not confined to America alone.

The rôle of the thyroid or parathyroids would seem, according to a series of observations reported to the Vienna Medical Society on April 5th, to be even wider than that so far accorded them. Nearly all the cases of dwarfed development that came under the observer's notice, even when seemingly entirely unassociated with any symptoms of myxedema, had as an accompaniment errors of development of the thyroid. Many congenital anomalies, especially the more serious ones, would seem to be likewise associated with defects, either atrophic or hypertrophic, of this important gland. Something of this may be due to the fact that effect is taken for cause, and that anomalies of the thyroid, by defect or exaggeration, are present when other anomalies occur; but there seems in addition to be good grounds for thinking that the glandular malformation is primary and causative.

The question of the botanic specificity of microbes, which is to take up some of the attention of the coming International Medical Congress at Moscow in August, is, to all appearances, going to bring out a series of striking contributions to the principles that underly the infant

science of bacteriology. Not all of them will be confirmatory of a number of theories that have so far been generally accepted. There is even more than a hint given that some of the papers will be rather revolutionary in character, and that the basis on which a good deal of work has been done as regards the specific pathogeneity of certain bacterial forms will be materially modified, and perhaps entirely swept away.

The position of the French school, especially of the great bacteriologists at the Pasteur Institute—Duclaux, Metchnikoff, and Roux—with regard to the specific pathogeneity of certain bacterial forms that have, until recently, been universally accepted as undoubtedly specifically causative of disease is well known. The cholera and typhoid bacilli, perhaps even the diphtheria bacillus, and others, would seem to have lost some of the reputation for specificity that has been accorded them so long.

The Austrian school, as represented here at Vienna, would seem to have decided tendencies in the same direction. Closely in touch as they are with German scientific matters all over the German Empire, because of a common mother-tongue, the Vienna school may be looked upon as understanding thoroughly the state of mind generally of German-speaking bacteriologists. There is an almost universal air of expectancy in the matter, and hints are dropped of interesting developments. The outcome cannot fail to be of unusual interest for scientific medicine generally and bacteriology and hygiene in particular.

A series of cases of erysipelas treated with applications of simple vaselin, with excellent results, have just been reported to one of the medical journals here. One can look at the report in two ways, I suppose; either vaselin has been developing therapeutic properties hitherto undreamed of (and then one could accept the report seriously and proceed to treat his next case of the disease in this way, with good or ill success according to whether his state of mind is distrustful or confiding), or one might remember that erysipelas, being as a rule self-limited and running a definite course, has enjoyed the privilege of having at one time or another half the drugs in the pharmacopeia vaunted as specifics for it, and so let the matter drop. Meantime, it is encouraging to find that it is not only in America, completely benighted medically as it would seem to be to most German and Austrian medical men, that long-since exploited therapeutic measures find their way into the medical journals with the specious testimony of a series of cases which test their value.

A good deal of attention has been devoted in the medical journals here, and by the public generally, to the question of doctors' fees. Until a recent decision of the *Arzt-Kammer*, there has been no regularly recognized fee for medical services in Austria. A legal decision was given some fifty years ago, I believe, when money was of much greater value than it is now, which empowered the physician to collect 50 kreutzers (about 20 cents) for each professional visit. The taking of legal steps for the collection of a bill has been generally looked upon as almost, if not quite, unprofessional. The *Arzt-Kammer*, a sort of representative body that in different districts in Austria regulates the relations of physicians with each other and

with their patients, and has power to make certain rules and inflict certain penalties, has lately attempted to obviate some of the difficulties that almost necessarily arose under this state of affairs by announcing the legal fee that a doctor could demand for a professional visit within a certain radius. The amount was set at 3 gulden (\$1.20), though less could be asked where the circumstances of the patient would not allow him to pay this much. The decision has raised a storm of comment, a good deal of it being unfavorable. The public does not seem to like to be reminded that physicians' fees are rights and not merely the material expression of a grateful patient's feelings. Some of the doctors have been inclined to think the decision inopportune, while others have expressed the opinion that the fixing of the fee, though at the price that it has been the custom generally to give and ask, would react against the physicians themselves and really lessen the amounts that might be paid by certain patients. To an outsider this does not appear probable, while the definite fixing of a fee would seem to have its advantages.

The discussion brings out the fact, however, that physicians are even worse paid here than among ourselves, and a profound feeling of justifiable dissatisfaction at the state of affairs has taken hold of the profession. The comparison with the honoraria paid to other professional men is not calculated to lessen this feeling. As has been said here, "In no profession is there such a disproportion between the quality and amount of work done and the reward obtained. Taking merely the material labor, how many visits must not a doctor make, and how many steps must he not climb for 1000 gulden! Yet he is, and must be, one of the most highly educated of professional men." It would seem as though the world-wide dissatisfaction in this connection must lead very soon to the development of a better state of mind in the general public as regards the rewards to be given the physician for his skill and labor.

## SOCIETY PROCEEDINGS.

### ASSOCIATION OF AMERICAN PHYSICIANS.

*Twelfth Annual Meeting, Held at Washington, D. C., May 4, 5, and 6, 1897.*

(Continued from page 617.)

THIRD DAY—MAY 6TH.

#### THE RELATION OF NEURASTHENIC CONDITIONS TO THE GENERAL NUTRITION,

was the title of a paper by DR. R. T. EDES of Jamaica Plain, Mass.

He held that gain in body weight and improvement in neurasthenic symptoms usually go together, but that there are enough exceptions to the rule to show that the nervous nutrition is something more than a mere sample of the general. The more symptoms approach in character the "fixed idea" of the insane the less amenable are they to the beneficial effect of mere somatic therapeutics. The blood color of a considerable number of neurasthenic patients corresponded quite closely with

that of the employees in the same institution. It is not possible to establish any correspondence between the degrees of anemia and the intensity of nervous symptoms. Measurements of the excretion of uric acid afford no sufficient ground for supposing that neurasthenic symptoms depend in any way upon this substance. There may be such a thing as a chronic uric-acid headache, but the ordinary continued neurasthenic headache is not of this character. Indican determinations have not been numerous enough to be decisive, but do not seem to indicate that the poison consists in this substance or in those which may be transformed into it. If neurasthenia is a toxic condition, the poison has not yet been satisfactorily identified.

#### DISCUSSION.

DR. JAMES J. PUTNAM corroborated the statement that patients might look very pale and yet have a normal percentage of hemoglobin. As to the influence of uric acid upon the causation of the disease he is still in doubt. It is not safe as yet to give a name to the agent which causes the condition, but we are learning more and more every day that the pathology of nervous disturbances may be connected with changes in metabolism. Study of cases of epilepsy must cause a good deal of doubt to arise as to whether the changes which are found are the cause of epileptic attacks or the result of them.

A paper, entitled

REFLEX NEUROSES OF THE ABDOMEN,  
was read by DR. NORMAN BRIDGE of Los Angeles, Cal.

The paper set forth, from a clinical standpoint, a large number of cases of reflex neuroses or symptoms, such as urticaria, pruritus ani, convulsions in children, etc., which were simply reflex manifestations of abdominal disorders. He desired to call attention to the fact that these symptoms are often reflex in origin, for they are frequently overlooked, and often tend to confusion in diagnosis.

#### DISCUSSION.

DR. CHARLES G. STOCKTON said that the "post-prandial diarrhea" of which Dr. Bridge had spoken occurs with sufficient frequency to entitle it to a special name. In addition to the hurried evacuations, there is almost invariably a gastric anacidity. These two symptoms are peculiar. In each of the cases which he had seen there were striking errors in the accommodation of the eyes. He did not mean to assert that these conditions were dependent upon this ocular error, but he thought it had some influence. A second point which he wished to refer to was the subject of pigment neuroses. These can often be explained by some condition of the stomach, intestines, or kidneys, and he had seen relief of this condition follow the replacement of a displaced kidney.

A paper on

THE ROENTGEN RAYS IN THORACIC DISEASE,  
was read by DR. FRANCIS H. WILLIAMS of Boston.

This paper was a sequel to one presented by the author at the last meeting of the Association, and illustrated the progress which a year has witnessed in the utilization of these rays. The paper was illustrated with skiographs showing diseased conditions of the lungs and heart. The

rays were especially serviceable in pneumonia, pleurisy, and tuberculosis of the lungs, enlarged heart, and pericarditis with effusion. Skiagrams of the leg were also presented, showing not only the bones, but also the tendons, nerves, and blood-vessels.

#### DISCUSSION.

DR. FITZ of Boston showed several skiagrams of two cases of aneurism of the aorta. The question had been raised of the transmissibility of the X-rays through calcareous substances, but he had succeeded in illustrating the possibility of photographing renal calculi. These rays also make possible the diagnosis of obscure cases of pelvic disease.

#### A CASE OF ACROMEGALY

was reported by DR. O. T. OSBORNE of New Haven.

DR. W. H. WELCH of Baltimore introduced Dr. Osborne, who is not a member, to the Association, and asked that he be allowed to present some pathologic specimens from a case of acromegaly which had been under his care, the patient having recently died. The patient had had the disease twenty-three years, and two photographs—one taken in 1887 and the other in 1892—gave a graphic description of the progress of the disease during that time. The man was 5 feet 9 inches in height, and had a marked kyphosis, which took several inches off his stature. At death he weighed 300 pounds. The brain was normal, but the heart was enormously enlarged, weighing 2 pounds 9 ounces—one of the largest hearts on record. The thyroid weighed 101 grams, but contained only one-twentieth of the normal amount of iodin. An internal thyroid was found, very much smaller than the other, but containing twice the amount of iodin. Photographs of the different parts of the skeleton, placed side by side with corresponding portions of the skeleton of a normal 6-foot man, were exhibited, and showed very clearly the enormous increase in the size of the bony skeleton.

#### THE CHEMICAL PROPERTIES OF THE BLOOD-PRESSURE-RAISING CONSTITUENTS OF THE SUPRARENAL CAPSULE,

was the title of a paper by DR. JOHN J. ABEL of Baltimore.

Dr. Abel described the fruitless efforts of Vulpian and more recent investigators to isolate the chemic constituents of the suprarenal capsule that gave to it its blood-pressure-raising power. He then told of his experiments in the same line, and described the technic by which he finally succeeded in isolating what appeared to be the active principle of the suprarenal capsule from an aqueous solution of the gland. He exhibited sphygmographic charts showing the marked increase in blood pressure following the administration of this active principle, and also the less marked increase following the administration of the aqueous extract.

#### DISCUSSION.

DR. WILLIAM OSLER asked Dr. Abel whether he had examined any of the commercial extract of the suprarenal capsule now on the market with reference to their blood-raising properties. He had several cases of Addison's dis-

ease which he had been treating with a commercial extract of the suprarenal gland, but so far without effect.

DR. ABEL replied that he had not examined any of them, but he thought it very likely that they did contain this blood-raising principle. It was only necessary to chop up the gland and powder it.

#### ON THE OCCURRENCE OF THE FAT-SPLITTING FERMENT IN PERITONEAL FAT NECROSIS.

A paper with this title was read by DR. SIMON FLEXNER of Baltimore.

He said that upon the etiology of peritoneal fat necrosis much light has recently been shed, partly through the findings in cases occurring in human beings and partly through animal experimentation. A study of the cases in the literature would make it appear that the occurrence of fat necrosis was not always due to the same cause. Although infection seems in certain cases to play a part, it is probable that it is not by any means the most important factor. The view has gained ground that the disseminated forms of necrosis met with in the peritoneal cavity, as well as the more circumscribed lesions in the pancreas itself, may result from a perversion of the pancreatic secretion. Again, since it has been shown that trypsin, when injected into the peritoneal cavity, does not set up this condition, the suggestion that the fat-splitting constituent of the secretion, steapsin, might possibly prove to be the chief cause, has been ventured. In the literature no record occurs of any attempt to demonstrate the presence of this body in the areas of necrosis, and it is possible that investigators were deterred by the belief in its extreme sensitiveness.

#### DISCUSSION.

DR. W. H. WELCH said that some years ago he had brought before the Association a case of necrosis of the pancreas in which a micro-organism was present. This was the first time on record that the colon bacillus had been demonstrated in the pancreas. Cultures were made of the colon bacillus, and presented to the Association, and he had remarked that this organism had nothing to do with the fat necrosis.

A report on "Further Studies upon the Pathogenic Spirilla of the Schuylkill River at Philadelphia" was made by DR. A. C. ABBOT and DR. D. H. BERGEY of Philadelphia.

This paper was a continuation of one read by Dr. Abbott at the last meeting of the Association, and was a record of the progress made in the demonstration of pathogenic spirilla in the drinking water of Philadelphia. A spirillum had been found resembling the spirillum of cholera in most particulars, but differing from it in a few points.

#### DISCUSSION.

DR. GEORGE M. STERNBERG said he considered the discovery of this spirillum in the water of the Schuylkill, at a time when there was no cholera in the country, and had not been for years, one of great importance. If the discovery had been made at a time when cholera prevailed here, this would undoubtedly have been considered the bacillus of that disease.

ON THE APPEARANCE OF CERTAIN AMEBA-LIKE BODIES IN THE BLOOD OF VACCINATED MONKEYS (RHESUS) AND CHILDREN, AND IN THE BLOOD OF VARIOLA. AN EXPERIMENTAL STUDY.

A paper on this subject was read by DR. WALTER REED of Washington.

Following the introduction of Koch's improved methods, the search for the specific causative agent of vaccinia had been made especially along the line of bacteriologic research. Notwithstanding many claims of positive results, these had in the end proved groundless. During the past ten years, and more especially during the last half decade, the attention of investigators had been turned toward the possibility of the animal nature of the parasite. Van Der Loeff, L. Pfeiffer, Rieck, and more recently Ogata, had described minute bodies always present in vaccine and variolous lymph, which they assign to the sporozoa. The first attempt to cultivate the supposed parasite of vaccine lymph was made in 1892 by Guarneri, who used the cornea of guinea pigs and rabbits for this purpose. After forty-eight hours, epithelial scrapings from the inoculated cornea, suspended in a hanging drop of aqueous humor, showed little shining slowly amoeboid bodies, often with irregular margins, within the epithelial cells. Guarneri considered these bodies to belong to the Protozoa, and called the parasite citorcytes vaccinæ.

Dr. Read's own experiments confirmed in some respects Pfeiffer's observations. Bodies of a corresponding size and amoeboid in character appear in the blood of vaccinated monkeys about the 7th and disappear about the 12th day. The same bodies are found in the blood of vaccinated negro children, but were much more difficult to find in the blood of white children, and in several cases of the latter could not be discovered. Bodies of a like nature, though differing somewhat, were found in the blood of three (3) small-pox patients during the height of fever, disappearing later.

AN EPIDEMIC OF CEREBROSPINAL MENINGITIS CAUSED BY THE DIPLOCOCCUS INTRACELLULARIS MENINGITIS (JÆGER).

(a) Clinical Report, by DR. F. H. WILLIAMS of Boston.

(b) Pathological Report, by DR. WM. T. COUNCILMAN of Boston.

This joint paper described from both clinical and pathologic standpoints an epidemic of cerebrospinal meningitis occurring in the Boston City Hospital, and in which the diplococcus intracellularis meningitis had been shown to be the cause. An account of the experiments undertaken with a culture of this bacillus was also given.

DISCUSSION.

DR. GUITERAS said he had two cases of the disease to report, but he regretted that he could not give the details as yet. One had occurred within the past fifteen days in the University Hospital, Philadelphia, the patient being a nurse in the hospital. He hoped to publish the details shortly. The second case occurred a few days ago in a new-born infant, and so seemed to contradict one of the statements of Dr. Councilman.

DR. F. H. WILLIAMS said that the lumbar puncture

was valuable, chiefly as a means of diagnosis. Moreover, it did sometimes give relief, but only temporarily.

DR. GEORGE M. STERNBERG asked whether any of the cases had recovered.

DR. WILLIAMS replied that seventy per cent. died.

DR. COUNCILMAN said that an interesting feature in regard to the character of the exudation, which he had meant to bring out, was that it had a marked tendency to extend along the cranial nerve, and along the optic nerve almost to the eye. The auditory nerve was also followed into the foramen. In consequence of these complications there had been loss of sight and hearing in some of the patients who recovered.

DR. F. C. SHATTUCK said that his experience with this epidemic embraced fifteen cases. A peculiar thing in his cases was that not a child died and not an adult recovered.

A CASE OF LEVANT FEVER

was reported by DR. A. A. SMITH of New York.

He gave the details of a case contracted upon the Mediterranean and treated by him in New York. The fever lasted three or four weeks, then came a period of freedom from fever, and then a period of relapse. The fever, while resembling malaria in many particulars, differed from it in that it resisted quinin in doses of twenty to ninety grains a day, whether given by the mouth or hypodermically. Anemia was not marked. The time cycle of levant fever differs from that of any form of malarial fever, being shorter than the tertian, which completes the cycle every forty-eight hours. The parasite of levant fever is larger than that of malarial fever. The only form of malarial fever with which it can be confused is the estivo-autumnal variety.

DISCUSSION.

DR. F. C. SHATTUCK asked whether arsenic had been tried.

DR. SMITH replied that every form of antimalarial medicine had been resorted to except phenic acid.

DR. GEORGE DOCK said that the diagram of the blood-cells which had been shown resembled those of malarial fever without pigment, though many observers were skeptical of the existence of such forms.

A paper on

THE EARLIEST POSSIBLE RECOGNITION OF TUBERCULOSIS,

was read by DR. JAS. T. WHITTAKER of Cincinnati.

It discussed the treatment of tuberculosis by tuberculin. Tuberculin had been objected to on the ground that its use in man had given the reaction when there were no symptoms of tuberculosis, but these should be regarded as cases of concealed tuberculosis. In lupus, actinomycosis, and allied diseases, tuberculin has produced cures. Doses of from one to ten milligrams were especially useful for their diagnostic effect. The author had never seen untoward symptoms follow the administration of even very large doses. As much as one gram had been given at a single dose in actinomycosis without producing bad effects. He had used it in 1000 cases and had never seen unpleasant symptoms follow. He believed that early

cases of tuberculosis are amenable to cure by Koch's improved tuberculin.

#### DISCUSSION.

DR. F. C. SHATTUCK said that tuberculin was being used in the Massachusetts General Hospital for its diagnostic effects. So far as his experience goes it seems to be innocuous. Cases have been found to react to tuberculin when there were no evidences of tuberculosis, and it has been difficult to account for such cases. As an example he cited the case of a girl of twenty years who had an epigastric tumor, and it seemed improbable that it could be of a malignant nature. She reacted to tuberculin, which led to the suspicion that the tumor might be tuberculous. Later she died, and the autopsy showed that she had a sarcoma. She had, however, a tubercular nodule at the apex of the right lung.

DR. A. LAWRENCE MASON said that tuberculin had been used at the Boston City Hospital for its diagnostic properties for some years. He thought it especially valuable as an aid to diagnosis in cases of suspected tuberculous peritonitis, and as a guide to the necessity of doing laparotomies in such cases.

#### SOME PRODUCTS OF THE TUBERCULOSIS BACILLUS AND THE TREATMENT OF EXPERIMENTAL TUBERCULOSIS BY ANTITOXIC SERUM,

was the title of a paper by DR. E. A. DE SCHWEINITZ of Washington.

A description was first given of two of the products obtained from tuberculosis cultures, one of these a crystallizable acid, and its probable bearing upon the progress of the disease. A brief sketch of some experiments showing the relationship of the attenuated tuberculosis bacillus to immunity was given, followed by a description of methods for the production of antitoxic serum and its experimental application.

A paper, entitled

#### A FURTHER STUDY OF SOME OF THE UNTOWARD EFFECTS OF THE BROMIDS,

was read by DR. H. A. HARE of Philadelphia.

The author prefaced his paper with the statement that he had been led to an investigation of this subject by the remarks of Dr. S. Weir Mitchell at the last meeting of the Association. He had thought that those remarks were based upon original observations, but he had learned from correspondence with the superintendents of asylums that the subject was an old one with them. The paper was based largely upon the answers of asylum superintendents to a circular letter, and a summary showed most of them were of the belief that the administration of the bromids led to alienation and delusions. Many of them reported that the nervous symptoms ceased when the drug was discontinued. It was not the opinion that the bromids produced insanity or epilepsy, but that when given in such cases it led to the development of suicidal or homicidal mania.

#### DISCUSSION.

DR. H. C. WOOD said that maniacal delirium is quite common after the administration of the bromids and that it is peculiarly common in the case of epileptics. Persons

subject to epilepsy are very apt to suffer from maniacal nerve storms, in which they develop suicidal or homicidal tendencies after the administration of the bromids.

DR. I. E. ATKINSON was of the opinion that the conclusions of the asylum superintendents, cited by Dr. Hare, rested upon incorrect reasoning, and thought that the attacks of mania spoken of are merely the manifestations of the epilepsy in a different form, and not the result of the bromids. Another point which he wished to make was that bromid of ammonia is far superior to the bromid of potassium or soda.

DR. HARE, in conclusion, said that nearly every asylum superintendent who had written to him ended his letter by expressing the hope that he would succeed in impressing upon the general practitioner a realization of the dangerous nature of the bromids. The first thing done when a patient enters an asylum is to get him over the effects of the bromids which have been given to quiet him. The effort is always to build up the system and cut off the bromids entirely. He did not think that these untoward effects are due especially to the bromid of potassium, but that the general depressing effect of the bromin on the general health tends to an increased mental unbalance.

The following papers were read by title :

THE EFFECTS OF VARIOUS METALS AND METALLIC SALTS ON THE GROWTH OF CERTAIN BACTERIA ; a continuation of a similar paper read before the Association of American Physicians, May 30, 1894. By DRs. B. MEADE BOLTON and W. G. BROWN of Columbia, Mo.

A CASE OF ADENOMA ON THE LIVER WITH COMPLICATIONS,

by DR. A. JACOBI of New York.

#### THE TREATMENT OF LITHEMIA,

by DR. B. L. RACHFORD of Cincinnati.

#### PRIMARY TUBERCULOSIS OF THE KIDNEY,

by DR. D. D. STEWART of Philadelphia.

The following officers were elected : President, F. W. Shattuck ; Vice-President, G. Baumgarten ; Recorder, I. Minis Hays ; Secretary, Henry Hun ; Treasurer, W. W. Johnston ; Member of Council, M. A. Starr.

The following honorary members were elected : Samuel C. Chew, and F. T. Miles, Baltimore.

The following active members were elected : Arthur C. Cushing, Ann Arbor ; W. S. Thayer, Baltimore ; Ludwig Hektoen, Chicago.

#### AMERICAN SURGICAL ASSOCIATION.

Eighteenth Annual Meeting, Held at Washington, D. C., May 4, 5, and 6, 1897.

#### THIRD DAY—MAY 6TH.

(Continued from page 614.)

DR. W. W. KEEN, in discussing Dr. Tiffany's paper on "Intracranial Surgery," said that he considered disinfection in these cases of great importance. He referred to the fact that he had observed abroad in certain places

that no disinfection was performed until the moment of operation, and spoke rather unfavorably of this practice. He stated that the size of the opening in the skull depends largely upon what it is necessary to do, and recommended Pyle's chisels as being the best instruments with which to make the opening. According to his experience, there were a number of objections to the use of the dental engine, but when used he considered Cryer's the best. Referring to osteoplastic operations, he stated that he had replaced the bone in probably fifteen different places, some of them being as large as  $1\frac{1}{2}$  inches in diameter, without any bad results, but advised that these replacements be done with the utmost care. He always keeps the pieces of bone that have been removed in a 1 to 2000 solution of bichlorid of mercury at a temperature of from  $100^{\circ}$  to  $150^{\circ}$  F., placing therein a thermometer and detailing one nurse to exclusively attend to it. If the pieces of bone are not replaced, the membrane will fill up the aperture and leave a depression which in the case of the forehead is quite objectionable.

He favored performing these operations in two stages, at a interval of from one to two months, under ordinary circumstances, although in some cases not more than three or four days should be allowed to elapse. In his opinion the greatest danger in re-opening a wound is the risk of infection. The two principal factors in cerebral surgery are the time that elapses during the opening of the skull and the hemorrhage, and he referred to a recent case in which almost every possible means of controlling hemorrhage failed until it was feared the patient would die on the table. A previous operation was performed on the same patient, and also a subsequent one without this alarming symptom presenting itself.

DR. ROBERT WEIR of New York also referred to the question of hemorrhage, and stated that he employs one or two moderate-sized hat pins over which he places two or three stout rubber bands, and these, with the occasional use of the clamp, and sometimes of a band around the head, usually control it. To a large extent he has given up the use of the chisel in these operations, and especially in the cases of a thick skull. He rarely resorts to osteoplastic operation at the present time, and prefers to allow for intracranial pressure. Of late years he has preferred the electric saw for these operations. In closing these wounds he stated that he is in the habit of using a celluloid plate and reported a case in which good results have been maintained for five years.

DR. J. PARMENTER of Buffalo preferred the gouge and hammer to the chisel for opening the skull, and believed that the dangers are less. Speaking of the surgical engine and the electric saw, he did not see any objection to their use if the cranial bones are vascular, but if they are not, necrosis will follow. As to controlling hemorrhage, he prefers a modification of Dr. Weir's method, and considers the forceps the best instrument for crushing bone. He thought the practice of palpating the intracranial structures a bad one, as it is attended by much risk. He considers cleanliness in these cases of vital importance, and referred to a case in which he recently opened a previously closed wound and found

glass and other substances imbedded. Excellent results followed the complete cleansing of this wound.

DR. S. J. MIXTER of Boston believed in the employment of extensive flaps in these operations, instead of running the risk of having to enlarge the incision afterward. He considered the trephine the most used instrument for opening the skull, and recommended that it should never be over three-quarters of an inch in diameter. He thought it might be well, when dividing the operation into two stages, to place between the skull and the skin a piece of celluloid to prevent adhesion. He advised pressure as the best means of controlling hemorrhage, and considered that an important question to be decided was the amount of pressure the brain can stand, he believing that it is sometime doubtful in fatal cases whether death is due to hemorrhage or to compression. Again, in cases of hernia of the brain, the question of the amount of pressure to be employed is important. He strongly recommended that a skilled pathologist should be present where an exploration of the brain is to be made to determine the presence of a tumor so that small fragments removed may be immediately examined and their nature determined. He thought that the question of closing the wound or leaving it open is still unsettled.

DR. CHRISTIAN FENGER of Chicago read a paper, entitled

#### URETERECTOMY.

He treated the subject under three headings: First, when the ureter is removed simultaneously with the kidney; second, when, after nephrectomy, the removal of the ureter of the same side becomes necessary; and third, when the entire ureter is removed alone. He also referred to a partial operation when only a portion of the ureter is taken away. He divided the operation into four kinds: First, transperitoneal; second, extraperitoneal; third, sacral; and fourth, transvaginal. He stated that ureterectomy has been performed for tuberculosis, suppuration in the dilated ureter, hydrops of the ureter, and for non-infected dilated ureter. He said that primary total ureterectomy was performed by Kelly, in 1896; primary partial ureterectomy by Tuffier, in 1891, by Kelly, in 1893, and by Postnikow, in 1892. Secondary total ureterectomy was performed by Reynier, in 1892, and secondary partial ureterectomy by Poncet, in 1894. He concluded his paper by giving a number of statistics of the various operations.

DR. A. T. CABOT of Boston considered the ureter as being very accessible extraperitoneally by the Isarel incision. In removing a portion of the ureter he thought the question of the advisability of removing the last few inches must be settled at the time of the operation. He saw no especial advantage in transplanting the end of the ureter into the vagina, and thought the discharge from a lumbar fistula quite as endurable as a discharge from the vagina. He did not think the operation of ureterectomy is called for, except when extensive suppuration or when tuberculosis exists. He advised cutting off the ureter as low as possible when tuberculosis exists, and stated that the remainder could be removed at a subsequent operation if necessary.

DR. M. H. RICHARDSON of BOSTON showed some colored pictures of a case of extirpated ureter.

**A CASE OF FEUGER'S PYELOPLASTY FOR INTERMITTENT HYDRONEPHROSIS**

was reported by DR. MAURICE H. RICHARDSON of Boston.

A woman of twenty-nine presented a tumor of varying size in the region of the gall-bladder. The tumor could be felt only when there was pain and tenderness in the side. It was supposed to be a distended gall-bladder, and was exposed March 17, 1896. It proved to be an enlarged renal pelvis. With the subsidence of the tumor there was an increase in the amount of urine. After recovery from the exploration the patient had a recurrence of the distress and pain, with reappearance of the tumor. On October 22, 1896 the speaker did the operation upon the kidney, described and performed by Feuger. The operation may have differed in some details, but the principle was Feuger's, as described in the *Annals of Surgery*. The pelvis of the right kidney was enormously enlarged. The ureter was inserted obliquely into the dilated pelvis. The distended pelvis pressed upon the spur sufficiently to obstruct the urinary flow. After free exposure of the parts by extensive lateral abdominal incision, the outer wall of the ureter and the contiguous inner surface of the pelvis were incised as described by Feuger. This longitudinal incision was converted into a transverse one by means of fine silk, as in the Heincke-Miculicz pyeloplastic operation. The exit of urine could then take place through a funnel-shaped opening. The patient made a perfect recovery. She was exhibited in April, 1897, at the Clinical Society of the Manhattan General Hospital. There had been no recurrence of the symptoms; no tumor could be felt.

Dr. Richardson also reported a case of "Chronic Intestinal Obstruction from Incomplete Volvulus of the Sigmoid Flexure."

**HABITUAL DISLOCATION OF THE SHOULDER-JOINT** was the title of a paper by DRs. HERBERT L. BURRELL and R. W. LOVETT of Boston.

The authors said that the term "habitual dislocation" should be restricted to cases where secondary dislocations occur from insufficient cause. Such cases show an atrophy of certain muscles. These are the scapula muscles, the latissimus dorsi, the triceps, the deltoid, and the coracobrachialis. There is no reaction of degeneration in these muscles. The fluoroscope shows that the X-ray penetrates the affected side more slowly than the other, and it can be seen that the head of the humerus on the affected side is further from the acromion. Pathologic evidence shows that there may be abnormality of the head of the humerus, rupture, and displacement of tendons and intra-articular fracture. Laxity of the joint capsule is almost universally noted.

The prognosis is that continued dislocations, increasing in frequency, will result if no treatment is undertaken.

The treatment may be (1) by apparatus (which is condemned), (2) by massage, (3) by massage and prolonged fixation, (4) by operation.

(a) Excision has been done in the past, but is mutilating, and has been superseded to a great extent by a simpler operation. (b) An anterior incision exposing the joint should be made, and after exploration of the joint, an elliptical piece of the joint capsule should be excised, and the capsule sewed up.

Two cases successfully operated on by this method by DR. BURRELL were reported.

Many other papers were read by title.

**AMERICAN NEUROLOGICAL ASSOCIATION.**

*Twenty-third Annual Meeting, Held at Washington, D. C., May 4, 5, and 6, 1897.*

**FIRST DAY—MAY 4TH.**

DR. M. ALLEN STARR of New York delivered the presidential address on

**THE TRANSMISSION OF SENSORY IMPULSES THROUGH THE SPINAL CORD.**

He thought that the conclusions derived from physiologic experiments upon the lower animals were open to grave criticism, first, because of the fact that the majority of such experiments performed years ago were carried out without antiseptic precautions, and were attended by secondary septic inflammations of the cord and its meninges, which invalidated the conclusions drawn from them; and, secondly, because of the great variation in the anatomic structure of the cords of the lower animals and of man.

It is no longer possible to speak of the columns of the cord as being exclusively ascending or descending in the direction of their fiber. Recent investigations by Hoche showed the existence of many association fibers of limited extent in the direct cerebellar columns and in the columns of Gowers, and therefore it seemed evident that every column of the cord contained fibers which passed in both directions.

Is it not evident, therefore, in the transmission of sensation through the spinal cord, cerebral axis and brain that we have to consider the tracts as different in their structure from those conveying motor impulses, and as consisting of a series of short neurons closely connected but with very numerous and widespread connections? Is it not probable that the result of this arrangement is to secure a diffusion of single sensations to various reflex, vasomotor, trophic, and automatic mechanisms as well as to the organ of conscious perception? And is it not also evident that this view of sensory diffusion explains the apparent inconsistency, at present prevailing between the clinical symptoms observed in Brown-Séquard paralysis, and the pathologic degenerations occurring in that disease?

DR. MORTON PRINCE of Boston reported three cases of "primary idiopathic hydrocephalus" in adults with autopsies, besides two others which terminated in recovery. The first case followed trauma and simulated latent abscess with secondary meningitis of the base. Trephining was done with negative result. At the autopsy the ventricles were found dilated to three times their normal size, the convolutions flattened, and the sulci almost obliterated. The speaker said that there is an acute and a chronic form

of the condition. The acute simulates the purulent form of meningitis, but differs from it in its course and the variability of the symptoms. The chronic simulates and is usually mistaken for cerebral tumor. The affection is common but not usually recognized.

#### AUDITORY APHASIA

was the title of a paper by DR. HOWELL T. PERSHING of Denver.

He said that auditory aphasia is the sum total of speech defects due to a lesion of the auditory center for words; it is a more precise term than sensory aphasia, and more comprehensive than word-deafness. The reader reported, as typical of auditory aphasia, a case in which the symptoms were word-deafness, verbal amnesia, jargon aphasia, paralexia, loss of comprehension of print, and agraphia, with retention of ability to copy Roman letters into script, and with no visual defects.

DR. PHILIP ZENNER of Cincinnati referred to a case with frequent attacks of word-deafness and spasm of the right side of the tongue and face. At the autopsy a tumor was found in the lower part of the Rolandic fissure, resting upon the first temporal convolution.

DR. G. L. WALTON of Boston read a paper, entitled

#### SUBARACHNOID SEROUS EXUDATION PRODUCTIVE OF PRESSURE-SYMPOMTS AFTER HEAD INJURIES.

The author arrived at the following conclusions: (1) A severe blow may result in local bruising and congestion with subarachnoid serous exudation. (2) The fluid may be imprisoned and cause focal paralysis. (3) The process is not compensatory, and is allied to the serous meningitis of Quinck. (4) The lesion is self-limiting. (5) Diagnosis from hemorrhage is difficult; atypical course. Absence of steady increase of symptoms, and persistence of sensitiveness point toward serous exudation. (6) Immediate operation is not necessarily indicated in focal paralysis, though perhaps always justifiable. (7) This condition is specially to be borne in mind before operating on children and young adults.

DR. B. SACHS of New York said the theory was not new. After head injuries, three possibilities were to be considered—hemorrhage, local edema, and purulent meningitis. The view of Dr. Walton was natural and plausible, and he agreed with him as to differential diagnosis. He would not operate on the skull too soon, not until after the lapse of forty-eight hours or several days.

DR. J. J. PUTNAM of Boston had seen several cases in which such a diagnosis could be borne out, but there was shifting of symptoms, which was important.

DR. C. A. HERTER of New York believed that local effusion could give rise to these symptoms, and spoke of a case of extreme general edema of the arachnoid following syphilis.

DR. JOSEPH COLLINS of New York related the case of a man, fifty years of age, who fell and struck his head in the left parietal region. This was followed by shock, stupor, and paralysis of the right upper extremity. At the autopsy there was some localized serous exudation, which was evidently of inflammatory origin.

DR. J. J. PUTNAM had seen venous hemorrhage into the pia, which was accompanied by hemiplegia.

The PRESIDENT thought that the question of localized edema should be one of fact and not of theory. He had seen three cases operated upon in which apparent inflammatory edema was found. He had also observed a case in which there was a very large amount of edema involving the entire hemisphere around a very small tumor.

#### ANESTHESIA IN DISEASES OF THE SPINAL CORD.

This paper was read by DR. PHILIP COOMBS KNAPP of Boston. He referred to the researches of Ross, Thorburn, Starr, and others. In syringomyelia the distribution of the anesthesia is more apt to follow another type, as in cerebral disease, where the boundary of the anesthesia is at right angles to the axis of the limb. Two cases were reported and many others cited proving this distribution. In other cases, however, as shown by Lachr, the sensory disturbances are of the spinal type. Brissaud endeavored to explain this difference by referring the cases with anesthesia of the spinal type to root lesions, and those with anesthesia of the cerebral type to lesions of the central gray matter of the cord; and Chipault, accepting that hypothesis, found that in the paraplegia of spinal caries both types occur, which he thought a valuable distinction between lesions of the roots and lesions involving the cord itself.

DR. B. SACHS referred to cases of spinal origin, which, however, do not seem to be of spinal type, but which he had good reason to believe presented a syphilitic affection of the cervical region of the cord. This type closely resembled syringomyelia. He did not like the term "cerebral anesthesia," but preferred "regional anesthesia."

The PRESIDENT said that it is practically impossible to lay down an accurate diagram of the anesthesias from various regions of the cord. Individual variations must be considered and admitted. Irregularity in distribution is characteristic of spinal anesthesia.

DR. FRANK R. FRY of St. Louis reported a case of

#### SPINAL LEPTOMENINGITIS.

A bacteriologic examination showed the infection to be purely purulent. The source of infection was a slight but rather chronic furunculosis on the back of the neck—the patient was a male house servant 27 years of age. The site of primary infection was the lumbar or lower dorsal region. The clinical history was that of an ascending paralysis with certain interesting features of temperature, etc. There was no cerebral involvement.

DR. HUGH T. PATRICK of Chicago reported

#### CASE OF SYRINGOMYELIA.

A man of forty-four years began to be weak in the legs ten years ago, which weakness gradually increased until he walked with difficulty. A year ago the hands also began to be affected. Examination showed spastic paraparesis with weakness of the grasp and slight atrophy of the small hand muscles. The sensory symptoms were most interesting. There was a band of anesthesia about

the trunk and extending on to the inner surface of the arms; an area of analgesia covered this and extended beyond it about four inches on the trunk and two inches on the arms. This distribution of sensory blunting is exactly the same as that which has been described by Laehr and the author as occurring in tabes, except that in the latter disease the band of analgesia is much narrower than that of anesthesia.

#### SECOND DAY—MAY 5TH.

##### ENCEPHALITIS WITH CHANGES IN THE PIA.

DR. ALFRED WIENER of New York read a paper on this subject and reported the case of a child three years of age, who, after meeting with an accident suffered from an attack of acute (non-suppurative) meningo-encephalitis. The child recovered after six months of illness. It remained perfectly well, and after an interval of three years, just subsequent to an attendance of three months at school, had a second attack which proved fatal. The autopsy and microscopic examination showed an involvement of the pia as well as the brain and the characteristic picture of acute non-suppurative hemorrhagic encephalitis.

##### LITTLE'S DISEASE. SHALL WE RETAIN THE NAME?

This was the title of a paper read by DR. B. SACHS of New York. He said that the use of the term "Little's disease" has led to great confusion. German and French authors have criticised English and American writers for not recognizing the disease as a distinct clinical entity. The name has not been adopted by the latter for the simple reason that Little's disease cannot be considered as anything more than a mere etiologic group comprising those cases of early infantile spastic palsies which are due to difficulties during labor resulting in asphyxia neonatorum. It cannot even comprise all spastic palsies that are in evidence from the time of birth, for many of them are not due to asphyxia, but to developmental defects, more particularly of the cortical or corticospinal division of the pyramidal tract. Some authors would make a distinction between general rigidity and cerebral diplegias and would call the cases of the former, Little's disease, but he is of the opinion that there is no rigidity without paralysis, and the difference is simply one of degree and not of kind. The division which the reader made into prenatal and birth palsies which has been endorsed by Freud should be continued, and the name Little's disease should be dismissed since it represents no distinct clinical group, and since a number of different morbid conditions are responsible for the infantile spastic palsies, or the cases of general rigidity appearing at the time of birth or shortly thereafter.

DR. FREDERICK PETERSON of New York differed from Dr. Sachs, as he had found that the greater the extent of the paralysis, the more the mental defect and epilepsy. At times he had found extensive paralysis without mental defect or epilepsy. He referred to 130 cases as having been reported, in which there were 30 with hemorrhage into the spinal canal.

DR. J. W. PUTNAM of Buffalo said that cases varied

in the symptoms according to their etiology. He spoke of two children in one family in whom there was extensive paralysis. One had marked mental defect and the other very little. Both pregnancies were attended with prolonged periods of vomiting.

#### THE NATURE AND TREATMENT OF SPASMODIC TORTICOLLIS.

DR. G. L. WALTON of Boston read this paper. He considered spasmodic torticollis as an affection of the cortical centers for rotation of the head. The pathology is not settled. The fact that it is sometimes easily inhibited does not establish a mental origin. Gross organic lesion is not present. Long-continued habit may merge into spasm, as seen in certain occupations. Eye-strain sometimes plays a part, through causing faulty position (oblique astigmatism, muscular insufficiencies). In one case it followed the wearing of a glass which increased instead of relieving an oblique astigmatism. The course of the disease is progressive. The principal muscles affected are the sternomastoid, splenius capitis, complexus, trachelomastoid, and the inferior oblique. The commonest form implicates the sternomastoid of one side and the posterior rotators of the other; less frequently the spasm is limited to the sternomastoid, occasionally to the posterior rotators of both sides (retrocollis), and rarely to the sternomastoid and posterior rotators of the same side. Treatment other than operative is ineffectual in well-established cases. Simple nerve-stretching is unavailing. The only operations to be considered are resection of nerves and section of muscles. Operations are generally too limited rather than too extensive. In most cases it will be necessary to resect the spinal accessory and the first three posterior branches of the cervical nerves. It will generally be wise to cut, also, the affected muscles. Muscle section alone has given good results (Kocher), but there is no reason to abandon nerve resection.

Absolute cure cannot be expected in over half the cases, improvement in a greater proportion, and failure in a certain proportion.

DR. W. M. LESZYNISKY of New York, after briefly referring to his successful use of increasing doses of atropin injected into the spasmodic muscles, mentioned the case of a lady thirty-five years of age, who had been under constant observation for the last eighteen months. The clonic spasm had previously existed for six months, and involved the sternomastoid, trapezius, and complexus. The sternomastoid was hypertrophied to about four times its natural size. Atropin treatment could not be carried out, owing to idiosyncrasy. Conium and gelsemium failed. After prolonged rest and tonic treatment, together with local massage, passive movements, and educational gymnastics faithfully carried out, the clonic spasm was absolutely cured, having been absent for nearly ten months. This has, however, been replaced by a mild form of tonic spasm, which is remittent. A peculiar feature in the case was the high specific gravity of the urine, which was due to urates. Whenever the gravity rose to 1030 to 1034, the spasm increased, seemingly indicating an autotoxic irritative element in the case. He

believed that if these cases were treated early by the foregoing method, very little would be left for the surgeon.

THIRD DAY—MAY 6TH.

AN UNCOMMON NASAL PARAESTHETIC NEUROSIS.

This was the title of a paper read by DR. SAMUEL AVRES of Pittsburg, who reported the case of a lady twenty-three years of age, recently married and of a neurotic temperament. The nasal disturbance began eight years ago, and was characterized by periodic flushings over the end of the nose. The attacks have increased in frequency and now consist in a sense of burning in the integument of the end of the nose, or over the entire cartilaginous portion. At the same time, there is general restlessness and considerable mental depression. No cause could be discovered. Various remedies had been used, such as local applications and the internal administration of bromids, cannabis indica, ergotin, etc., with only temporary benefit.

STEPS TOWARD INSANITY.

DR. SMITH BAKER of Utica read this paper, and said that the biologic doctrine that structure determines function is as applicable to the neuron as to other basal elements. Applied to insanity, psychiatry properly becomes an important branch of it. The primary presupposition of every instance of true insanity is that it is based upon arrest of development and a nurture too faulty to correct it. The step which initiates the degenerative tendency is unphysiologic marriage, and the perverse tensions and reactions which grow out of them. Another step is where two healthy people vitiate themselves by over-stress or nutritional perversions during the child-bearing period. With the individual, defective heredity plays a most prominent part in fixating degenerative tendencies. Frequently the ordinary educational course, the universal leaning on proxies, and various kinds of stimulants, are but ways of confirming all that are degenerative. Diseases and accidents are important because of the emotional stress involved. Arrest of development at puberty is serious always. The immediate causation of the structural change seems to come through exhaustion and auto-intoxication. This must interfere with the characteristic activity of the neurons, which activity seems to be on the point of discovery as an ameboid movement of the cells or their processes. Dissociation, confusion, systematization may thus come to be founded in actual structural defect, itself the result, primarily, of emotional stress in ancestry.

A number of other papers were read by title.

The following were elected to membership: Dr. Wm. G. Spiller of Philadelphia, Dr. H. M. Thomas of Baltimore, and Dr. Wm. Hirsch of New York.

Dr. E. C. Seguin of New York was elected an honorary member.

The following officers were elected for the ensuing year: President, Dr. G. M. Hammond of New York; Vice-presidents, Dr. Philip Zenner of Cincinnati and Dr. J. J. Putnam of Boston; Secretary and Treasurer, Dr. F. X. Dercum of Philadelphia; Councils, Dr. H. T. Patrick of Chicago and Dr. Chas. K. Mills of Philadelphia.

AMERICAN ORTHOPEDIC ASSOCIATION.

*Eleventh Annual Meeting, Held at Washington, D. C., May 4, 5, and 6, 1897.*

FIRST DAY—MAY 4TH.

THE President, DR. SAMUEL KETCH of New York, opened the proceedings by delivering an address on

THE WORK AND INFLUENCE OF THE AMERICAN ORTHOPEDIC ASSOCIATION.

He said that just ten years ago the American Orthopedic Association was born—the youngest offspring of surgery. During these ten years its members have presented 323 papers, covering every part of orthopedic surgery. Thus, 35 papers had been on hip-joint disease, 19 on knee-joint disease, 49 on Pott's disease, 20 on lateral curvature of the spine, 6 on torticollis, 14 on congenital dislocation of the hip, 43 on clubfoot, and 79 on spastic paraplegia. This should, in itself, be conclusive proof of the good scientific work that has been done, and also a refutation of the charge that orthopedic surgery is a specialty having very narrow limits. The influence that the Association has exerted was, perhaps, best shown by the fact that up to ten years ago but few of the medical schools made any attempt to teach orthopedic surgery, and only three had a systematic course. To-day, orthopedic surgery is as much a recognized branch as are the other surgical specialties. It has passed forever out of the hands of the instrument-makers, quacks, and bone-setters. Probably the day is not far distant when there will be a journal devoted exclusively to this specialty. There is every indication that the Röntgen ray will prove peculiarly useful in this branch of surgery, and that it will clear up many points now shrouded in obscurity. The address closed with memorial sketches of recently deceased members, including one of the venerable Dr. Henry G. Davis, "The father of American orthopedic surgery," and the originator of extension in the treatment of joint diseases.

DR. HARRY M. SHERMAN of San Francisco read a paper on

ERASION OF THE KNEE-JOINT WITH CONSERVATION OF THE EPIPHYSEAL CARTILAGE.

Epiphyseal ossification, the speaker said, takes place on the diaphyseal side of the cartilage. If all the diseased tissue can be removed without interfering with the cartilage, it is reasonable to suppose that a certain amount of the developmental energy of that cartilage may be conserved. The paper was based chiefly on an experience with three cases. Two of the patients presented themselves with marked flexion at the knee, with sinuses opening in front, and with the head of the tibia dislocated backward. Total arthrectomy and epiphyseotomy were performed in each case. The epiphyseal cartilages were preserved. Healing was uneventful, and each patient left the hospital with the limb straight and apparently solid. But in each case flexion occurred while the child was still under observation, and in spite of solid plaster-of-Paris splints. In one case, as shown in the radiographs presented, there had been a certain amount of growth at the

knee since the operation. The radiograph also showed that the flexion was due to the development of more bone in the anterior than in the posterior cartilage. The third case had been seen in a very early stage of the disease, and at first had done very well with a Thomas walking splint, except that an area of tenderness had persisted over the inner tibial tuberosity. The tissues over this portion were slightly boggy and condensed. After about two years, the case had been operated upon, the joint being removed, with the exception of the epiphyseal cartilages. The epiphyseal cartilages sloughed away with the exception of a circumferential band. This annular band had been sufficient to maintain the growth of the limb, and was shown by the fact that the amount of shortening had not altered. The general result had been most satisfactory, the functions of the limb being practically perfect. The radiograph showed that the cavity after the operation had been filled by a bone of rather lighter structure than the other bone. Dr. Sherman said that according to Mr. Cheyne it is important to locate and remove a tuberculous focus at an early stage, as this is often the means of cutting short the disease. By exploratory puncture with a needle, carried out with proper judgment, one can readily distinguish between tuberculous bone and sound bone, even in a young child.

DR. CHARLES L. SCUDDER of Boston said that the flexion referred to did not seem to him an undesirable complication; a slight amount of flexion—8° or 10°—was more comfortable to the patient than when the knee was absolutely straight.

DR. R. W. LOVETT of Boston said that his experience with arthroectomy had been very discouraging, but his results with excision, even when done late, and in bad cases, had been extraordinary. While he was of the opinion that our progress in the management of hip disease would be chiefly in the direction of earlier excision in selected cases, yet his personal experience with the conservative treatment of early cases of hip disease had been quite satisfactory, and he was rather opposed to operative treatment in cases of knee-joint disease.

THE PRESIDENT said that all surgeons had noted after excision that flexion was prone to occur, sometimes to a degree almost equal to the original deformity. Personally, he had found the conservative treatment of knee-joint disease in children favorable.

DR. SHERMAN, in closing the discussion, referred to the question of focal operations at an early stage. He said that Mr. Cheyne went further than Mr. Barker and Mr. Wright, in that he advocated operating upon a lesion as soon as it could be definitely located by the swelling and tenderness. In children, Dr. Sherman thought, it is difficult to locate such a focus by tenderness, but the thickening of the tissues might lead one to suspect the presence of such a focus. Mr. Cheyne's suggestion might be applicable to all joints except the hip. The latter should be excluded, owing to its deep situation and the absolute inability of the operator to know whether or not he has removed all diseased tissue. As we know the ordinary locations of the early foci of disease, we can usually do an exploratory operation with a small trephine.

#### CASES OF TRAUMATIC SPONDYLITIS.

DR. ARTHUR J. GILLETTE of St. Paul reported some cases of this kind. In the first one, the patient had slipped slightly on the sidewalk, following which there was paraplegia. After this had existed for five months, Dr. Gillette had first seen him, and had found a slight prominence in the upper dorsal region. This was associated with some rigidity and pain. The temperature range was quite typical of tuberculosis. Extension did not give relief as usual. The *post-mortem* examination showed the vertebral column, from the upper dorsal vertebrae to the sacrum, to be soft and spongy. The vertebrae throughout the column could be easily crushed with the fingers. The crest of the ilium, the ribs and the sternum were in the same condition. There was extensive tubercular disease of the lung, and enlargement of the liver and spleen.

The second case was that of a young farmer, of perfect development. He had severely sprained his back a few months before coming under observation. There was no immediate involvement of the spinal cord, but when first seen by the speaker, he was unable to walk, and there were exaggerated knee reflexes and marked ankle clonus. Any sudden jar caused pain in the back and legs. There was a slight prominence in the lower dorsal spine, and the muscles were rigid along the spinal column. While partially suspended for the application of a jacket, the patient had a severe attack of syncope. The case then developed the symptoms of basilar meningitis, and later on those of pleuritic effusion. Examination of the spinal column, *post-mortem*, was all that was allowed. The spinal cord was intact, and the membranes softened. In the upper dorsal region was a sinus passing into the left pleural cavity. This cavity contained apparently the same kind of fluid as the vertebral canal. Both the anterior and posterior segments of the vertebrae were carious.

The third case was in a robust young woodman, who sprained his back, and then developed symptoms and signs apparently indicative of vertebral caries. There were no symptoms of spinal-cord involvement. After a considerable time the patient died, and the *post-mortem* showed marked degeneration of the kidneys, a fatty liver, and a pulpy, dark red spleen weighing three pounds and four ounces. There was no evidence of tuberculosis in the lungs or spinal column. The spongy portion of several of the vertebrae had been reduced to a dark, pulpy mass.

DR. R. W. LOVETT presented a case of what he supposed to be

#### SPONDYLOLISTHESIS.

The patient was a youth of eighteen years, seen last September. He was of good physique, and enjoyed good health previously. In April, 1896, a wagon weighing 2600 pounds had passed over his pelvis. There had been no discharge of blood from the urethra or rectum after the accident, and after remaining in bed for a week or two without medical treatment, he began going around on crutches. When first seen by the speaker he walked in a bent attitude, leaning to the right. Movement in all directions was painful. The knee reflexes and the aspect of the case was that of a severe case of lumbar disease with ab-

scess. The shape of the hips, however, was almost like that of congenital dislocation of the hips, except that the trochanters were on Nelaton's line. They seemed, nevertheless, unduly prominent. The lumbar spine appeared to project forward abnormally, while the sacrum was in normal position. A plaster jacket was applied under suspension, and it gave relief. In February, 1897, he was so much better that a laced jacket was substituted. A few days ago, the man was discharged from treatment as all symptoms had disappeared. The deformity of the lumbar spine persisted, but it was apparently less marked than before. No motions were painful. The patient was no longer conscious of any disability.

DR. LOVETT said that the literature of spondylolisthesis was quite meagre. According to Neugebauer there are about ninety cases on record. It is probably due to a congenital deformity, or a defect of development, owing to atrophy produced by pressure.

THE PRESIDENT referred to the case of a young woman who had had a well-marked protrusion of the dorsal spine, with complete paraplegia of the lower extremities, and, for a time, of the arms. The girl had come to him originally as a case of round shoulders. The paraplegia developed about six months after treatment had been begun with an anteroposterior apparatus. After having been on a water-bed for two years, she died of exhaustion. The *post-mortem* examination was made by Dr. T. Halsted Myers, and no lesion of any kind was found in the vertebrae. The pathologist who examined the spinal cord never reported his findings. No organic lesions were found, and yet those who had seen the case during life felt convinced that it was neither a case of hysteria nor of malingering.

DR. E. G. BRACKETT of Boston presented a paper on  
THE TREATMENT OF TORTICOLLIS.

He said that surgeons are pretty well agreed, (1) that the contracted structures lying superficial to the deep layer of fascia must be overcome; (2) that the deeper structures—the muscles, ligaments of the spine, and all the parts involved in holding the head—must be further stretched; and (3), that we must correct the "habit" of holding the head in an abnormal position. Habit was hardly the word to be used, but owing to a readaptation of the muscles, the head would be held in an abnormal position unless systematic effort was made to overcome it. The structural changes in the ligaments, muscles, etc., should be overcome by stretching or by massage. When the head was put up in over-correction, it was continually stretched, but, in *selected* cases, one could depend upon the intermittent traction resulting from active massage and exercises. A roll should be placed under the neck of the patient, who should lie with the head turned to the opposite side in such a way as to cause over-correction of the deformity. In that position deep massage should be practised on the contracted structures, and on the trapezius of the opposite side. The next step was to make, up to the point of tolerance, forcible manipulations—depressing the head, etc. In the next place, the head being held as nearly in the correct position as possible, the patient should be required to do heavy work with

dumb-bells, the muscles being made to work in their long arc instead of the short one.

In connection with this subject of the treatment of torticollis, Dr. Brackett said he desired to allude to an accident or complication which he had not seen described before. In the case of the older patient, described in the cases appended to his paper, this accident had occurred: The patient had taken the ether very well. On attempting to correct the position of the head, his color became peculiar, and the respirations suddenly became shallow. These symptoms disappeared on releasing the head, but the same alarming symptoms recurred on returning the head to the corrected position. On this account it became necessary to use only a moderate correction at the time of the operation. Three days later, on attempting to correct the position, the boy developed the same symptoms, and fainted. This was repeated at the next attempt at correction. Even at the present time, if the head were corrected beyond a certain point, there would be a partial return of these symptoms. The only explanation that had suggested itself to him was that the vagus nerve had also become short along the line of the vessels, and had been thus put on the stretch when correction had been carried beyond a certain point.

DR. LEROY W. HUBBARD of New York said that he had recently treated a case of congenital torticollis in a girl of twenty-eight years. In this case the right shoulder had been elevated two inches, the right sternocleidomastoid muscle markedly shortened, and the whole right side of the face considerably atrophied, giving to the face a very peculiar expression. On January 5, 1897, he had operated by the open incision, dividing the sternomastoid in the middle, and also the trapezius and all contracted tissues. The parts were thoroughly stretched under ether, and the head put up in plaster of Paris in an over-corrected position. After about ten days, the wound having healed, the plaster was removed, and further correction was made before reapplying the plaster of Paris. Subsequently, a spinal apparatus with a Taylor chin-piece was substituted for the plaster. This was worn for about two months, and each day the patient was subjected to manipulations similar to those described in the paper. At the present time she held the head in good position, and could move it easily in all directions. She had not worn an apparatus for about two months. There was still some elevation of the right clavicle, and also some lateral curvature of the cervical spine, which had been very marked before the operation. The stretching and massage are very important in these cases of persistent torticollis.

DR. SHAFFER thought that certain cases of torticollis could be relieved by systematic massage and intermittent traction. The great difficulty is to get the proper points for extension and counter-extension.

In one case that he had seen, instead of a unilateral contraction, both sternomastoid muscles had been contracted, producing a forward position of the head not unlike the position assumed in Pott's disease. In this case there must have been a double lesion of the nerve and muscle.

(To be continued.)

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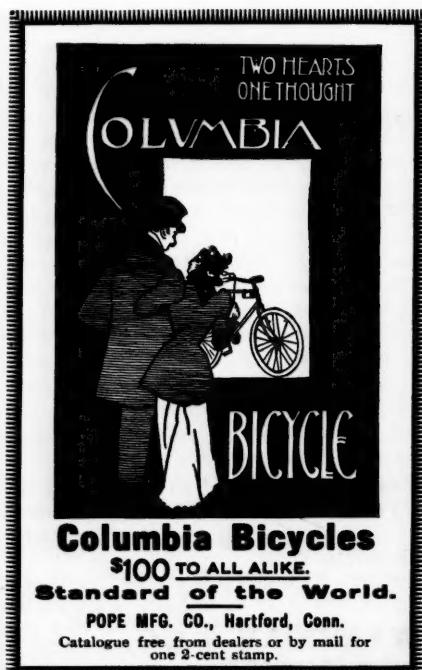
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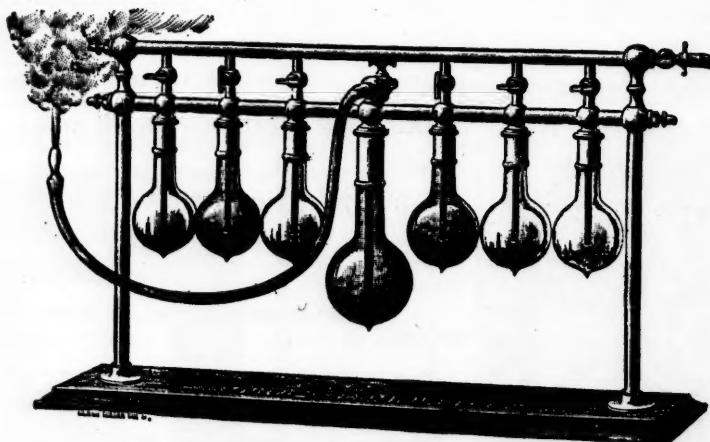
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The ordinary tonics—iron, quinine, strychnine, &c.—seem utterly unable to cope with this condition. In fact, it is not

stimulation that the patient needs, as by it he is only led to overtask his strength, and finally finds himself completely broken down. He needs a reconstruction of the worn-out tissues.

The remedy which will be effective, then, must be one that will convey to the tissues the revivifying and vitalizing agent, phosphorus, in its oxidizable and assimilable form. Thus the true vitality of the nerve structure is restored, and with it the healthy function is re-established. The process is not that of stimulation, or whipping up the exhausted powers, but is one of renewing the nutrition of the tissues themselves; hence, it is steady and sure in its progress and permanent in its results. The patient feels that he is gradually recovering his accustomed strength of mind and body.

The one form in which the compounds of phosphorus, as they exist in normal animal cells, can be conveyed to the tissues and there utilized is in the oxidizable form of the hypophosphites of lime and soda, chemically pure. It should be given early, and continued, at appropriate intervals, until the condition has been entirely overcome. Its favorable action in convalescence from acute diseases in general is especially marked in the disease under consideration. By its use many cases of chronic invalidism can be averted, and the susceptibility to intercurrent diseases corrected.

As it is essential to have the agent in an absolutely chemically pure form, McArthur's syrup should be prescribed. This is an agreeable, wholesome syrup, containing only the pure hypophosphites of lime and soda. If you are not already acquainted with it, a full-sized bottle will be sent you, if you will agree to pay express charges. Address, The McArthur Hypophosphate Company, Boston, Mass.